Defence
Safety Authority

Service inquiry

Death of a service person in an accident with a Warrior armoured vehicle on Salisbury Plain Training Area

21 June 2022

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Part 1.1

Covering note & glossary

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Part 1.1 – Covering note

DSA/SI/02/22

9 June 2023

DG DSA

Service inquiry into the death of a service person in an accident with a Warrior armoured vehicle on Salisbury Plain Training Area on 21 June 2022

1. The Service Inquiry panel assembled at the Defence Accident Investigation Branch (DAIB), in B120 at MOD Boscombe Down, on the 5 July 2022 by order of the DG DSA for the purpose of investigating the accident involving a Combat Vehicle, Infantry Command, Tracked Warrior (FV511) on 21 June 2022 and to make recommendations in order to prevent reoccurrence. The panel has concluded its inquiries and submits the provisional report for the Convening Authority's consideration.

2. The following inquiry papers are enclosed:

Part 1 Report Part 1.1 Covering note and glossary Part 1.2 Convening Order & TORs Part 1.3 Narrative of events Part 1.4 Findings Part 1.5 Recommendations Part 1.6 Convening authority comments	Part 2 Record of proceedings Part 2.1 Diary of events Part 2.2 List of witnesses Part 2.3 Witness statements Part 2.4 List of attendees Part 2.5 List of exhibits Part 2.6 Exhibits Part 2.7 List of annexes Part 2.8 Annexes Part 2.9 Schedule of matters not germane to the inquiry Part 2.10 Master schedule

President

[Signature]

[redacted]
President
Warrior SI

Members

[Signature]

[redacted]
Panel member 1
Warrior SI

[Signature]

[redacted]
Panel member 2
Warrior SI

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Glossary

Acronym	Meaning
#	
1 RRF	1st Battalion The Royal Regiment of Fusiliers
1 MERCIAN	1st Battalion The Mercian Regiment
1 YORKS	1st Battalion The Yorkshire Regiment
20 ABCT	20th Armoured Brigade Combat Team
5 RIFLES	5th Battalion The Rifles
5 RRF	5th Battalion The Royal Regiment of Fusiliers
2IC	Second in Command
2Lt	Second Lieutenant
A	
AAR	After Action Review
ACSO	Army Command Standing Order
AECO	Assistant ECO
AESP	Army Equipment Support Publication
AFV	Armoured Fighting Vehicles
AFVSR	Armoured Fighting Vehicle Schools Regiment
AICC	Armoured Infantry Crew Commander
AIPCC	Armoured Infantry Platoon Commander Course
ALARP	As Low as Reasonably Practicable
APC	Armoured Personnel Carrier
AQL	Acceptable Quality Levels
ARTD	Army Recruiting and Training Division
ARMCEN	Armour Centre
ASLS	ARTD Staff Leadership School
ASpec	Assessment Specification
ASPO	Assistant Senior Planning Officer
AStrat	Assessment Strategy
ATDU	Armoured Trials and Development Unit
ATUD	Authority to Use Document
AVSO	Armoured Vehicles Standing Orders
AV	Armoured Vehicle
B	
BAeBB	British Army electronic Battle Box
BATLS	Battlefield Advanced Trauma Life Support
BATUS	British Army Training Unit Suffield
BATUK	British Army Training Unit Kenya
BCS	Battlecraft Syllabus
BG	Battle Group
BGTI	Battle Group Thermal Imaging Sight
C	

CAEP	Combat Arms Ear Plug
CATT	Combined Arms Tactical Trainer
CBA	Cost Benefit Analysis
CFA	Commander Field Army
CFT	Commander's Functional Test
CGS	Chief of the General Staff
CIS	Communications Information Systems
CMT	Combat Medical Technician
CO	Commanding Officer
CONEMP	Concept of Employment
CONUSE	Concept of Use
COTE	Commanding Officers of Training Establishment
CP	Command Post
CPE	Combat Protective Equipment
CPR	Cardiopulmonary Resuscitation
CR2	Challenger 2
CQMS(T)	Company Quartermaster Sergeant (Technical)
C/S	Callsign
CS	Combat Support
CSS	Combat Service and Support
CT	Collective Training
CVR(T)	Combat Vehicle Reconnaissance (Tracked)
D	
DAIB	Defence Accident Investigation Branch
D&M	Driver and Maintenance
DCC	Dismounted Close Combat
DE&S	Defence Equipment & Support
DIO	Defence Infrastructure Organisation
DIP	Driver's Instrument Panel
DLOD	Defence Lines of Development
DLSR	Defence Land Safety Regulator
DMI	Driving & Maintenance Instructor
DMO	Direct Mode Operation
DS	Directing Staff
DSA	Defence Safety Authority
DSAT	Defence Systems Approach to Training
DT	Distributed Training
DTc	Defence Trainer Course
DTTT	Defence Train the Trainer
DVC	Deputy Vehicle Commander
E	
EA	Exercise Assistant
EASP	Exercise Action Safety Plan
EC	Equipment Care

ECO	Exercise Conducting Officer
EO	Enabling Objective
ERM	Equipment Registration Mark
ESRS	Equipment Standards Regulatory Schedule
F	
FE	Force Elements
FF	Fully Fit
FFE	Fixed Fire Extinguishers
FFL	Fully Functional LAS (Local Area Subsystem)
FFR	Fitted for Radio
FTS	Formal Training Statement
FUP	Forming Up Point
FV	Fighting Vehicle
G	
GM	Ground Manoeuvre
GMT	Greenwich Mean Time
H	
HCG	Hughes Chain Gun
HoC	Head of Capability
HOTO	Handover / Takeover
HF	Human Factors
HQ	Headquarters
IA	Immediate Action
IC	Intercom
ICSC(L)	Intermediate Command Staff College (Land)
ICT	Information and Communications Technology
ILSA	Improved Local Situational Awareness
ITR	Individual Training Requirement
J	
JAMES	Joint Asset Management and Engineering Solutions
JI	Joining Instructions
JNCO	Junior Non-Commissioned Officer
JOTAC	Junior Officers Tactics Course
JSP	Joint Service Publication
K	
KLP	Key Learning Point
L	
LAD	Light Aid Detachment
LAS	Local Area Subsystem
LEA	Land Equipment Audit
LEOC	Land Equipment Operating Centre

LEUMS	Land Equipment User Maintenance Standards
LOC	Land Operations Command
LR	Limited Role
LSpec	Learning Specification
LWC	Land Warfare Centre
M	
MATT	Mandated Annual Training Test
MCC	Mounted Close Combat
MEI	Mandatory Equipment Inspection
MIS	Management Information System
MOD	Ministry of Defence
N	
NCO	Non-Commissioned Officer
NIHL	Noise Induced Hearing Loss
NT	Non-Taskworthy
O	
OC	Officer Commanding
OES	Operational Equipment Standard
OPFOR	Opposition Force
ORBAT	Order of Battle
P	
Pam	Pamphlet
PCBC	Platoon Commanders Battle Course
PET	Pre-Employment Training
PPE	Personal Protective Equipment
PRC	Portable Radio Communication
Q	
QRH	The Queen's Royal Hussars
R	
RA	Risk Assessment
RATD	Reconnaissance and Armoured Tactics Division
RAU	Range Administering Unit
RCO	Range Conducting Officer
RDG	Royal Dragoon Guards
REME	Royal Electrical and Mechanical Engineers
RIG	Regimental Instructor Gunnery
RMAS	Royal Military Academy Sandhurst
RPS	Role Performance Statement
RSO	Range Standing Orders
RtL	Risks to Life
RTGS	Residual Training Gap Statements
RTR	Royal Tank Regiment

S	
SAF	Soft Armour Filler
SCR	Safety Case Report
SECO	Senior Exercise Conducting Officer
SECSR	Safety and Environmental Case Summary Report
SEP	Safety and Environmental Panel
SET	Support to Experimentation and Training
SI	Staff Instructor
SIM	Standards and Inspection Manual
SMP	Safety Management Plan
SNvE	Safety Notice Via Email
SOP	Standard Operating Procedure
SOTT	Statement of Trained Task
SOTR	Statement of Training Requirement
SP	Service person
SPO	Senior Planning Officer
SPTA	Salisbury Plain Training Area
SRCO	Senior Range Conducting Officers
SRM	Safety Risk Management
SSI	Senior Staff Instructor
SST	Safe System of Training
SSW	Safe System of Work
STV	Scalable Tactical Vest
SUCMC	Sub-Unit Commanders Management Course
SUCC StA and CA	Sub-Unit Commanders Course Special to Arms and Combined Arms
T	
TAM	Tactical Aides Memoire
TDA	Training Delivery Authority
TES	Tactical Engagement System
TETRA	Terrestrial Trunked Radio
TEWT	Tactical Exercise Without Troops
TGA	Training Gap Analysis
THPS	Tactical Hearing Protection System
TMO	Trunked Mode Operation
TO	Training Objective
TOR	Terms of Reference
TP	Training Provider
TPS	Training Performance Statement
TRA	Training Requirements Authority
TrAD	Training Authorisation Document
TTP	Tactics, Techniques and Procedures
U	
UAD	User Access Device
UCD	User Control Device

UECD	Unit Equipment Care Directive
V	
VST	Vehicle Support Team
W	
WIP	Work Induction Programme
WR	Warrior
WSM	Warrior Sergeant Major

Part 1.2

Convening order & TORs

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Defence Safety Authority

Service Inquiry Convening Order

5 July 2022

SI President	Hd DAIB	DAIB Mentor
SI Members	DSA HQ Legad	DAIB Office Manager

Copy to:

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PS/Min(DPV)	MA/CAS	DLSR-Hd ASCen CS(A)
PS/Min(DP) PS/PUS	PSO/COMD UKStratCom MA/CFA	Head DAIB EA/DDC Dir
PS/2PUS DPSO/CDS	3UKXX-CGP-DCOS	DDC Head of News
MA/VCDS	Dir HS&EP	DDC PR News Army
		APSG-BAS-DACOS

DSA DG/SI/02/22 – SERVICE INQUIRY INTO THE DEATH OF A SERVICE PERSON IN AN ACCIDENT WITH A WARRIOR INFANTRY FIGHTING VEHICLE ON SALISBURY PLAIN TRAINING AREA ON 21 JUNE 2022

1. In accordance with Section 343 of the Armed Forces Act 2006 and Joint Service Publication (JSP) 832 – Guide to Service Inquiries[1] and as the Director General of the Defence Safety Authority (DG DSA), I have elected to convene a safety Service Inquiry (SI).

2. The purpose of this SI is to investigate the circumstances surrounding the incident and make recommendations in order to prevent reoccurrence.

3. The SI panel members commenced their administrative briefings at 1200 on Tuesday 5 July 2022 at the Defence Accident Investigation Branch (DAIB), in B120 at MOD Boscombe Down and the SI was formally convened by me at 1530.

4. The SI panel comprises 3 members:

President: [redacted]
Members: [redacted]

5. The Legal Advisor to the SI is [redacted] Technical investigation/inquiry support is to be provided by the DAIB and the nominated mentor for this SI is [redacted].

[1] Issue 1.0 dated October 2008.

6. The SI panel is to investigate and report on the facts relating to the matters specified in its Terms of Reference (TORs) at Annex A. The SI panel is to comply with its TORs and record all evidence and express opinions as directed therein. An initial report is to be submitted to me by **Thursday 11 August 2022**.

7. Attendance at SI activities by advisors/observers, unless extended by the Convening Authority, is limited to the following:

Head DAIB – unrestricted attendance
DAIB investigators in their capacity as advisors to the SI panel – unrestricted attendance
Human Factors specialists in their capacity as advisors to the SI panel – unrestricted attendance

8. The SI panel will undertake its initial induction training at the DAIB facility at MOD Boscombe Down immediately after the SI's convening. Thereafter, permanent working accommodation, equipment and assistance suitable for the nature and duration of the SI will be requested at a location decided by the SI President in due course.

9. Reasonable costs will be borne by DG DSA under UIN [redacted].

[redacted]

S J Shell CB OBE MA
Air Marshal
DG DSA – Convening Authority

Annex:

A. Terms of Reference for the Service Inquiry into the death of a Service person in an accident with a Warrior Infantry Fighting Vehicle on Salisbury Plain Training Area on 21 June 2022.

Annex A To
DSA DG/SI/02/22 Convening Order
Dated 5 July 2022

TERMS OF REFERENCE FOR THE SERVICE INQUIRY INTO THE DEATH OF A SERVICE PERSON IN AN ACCIDENT WITH A WARRIOR INFANTRY FIGHTING VEHICLE ON SALISBURY PLAIN TRAINING AREA ON 21 JUNE 2022

1. As the nominated panel members for the subject Service Inquiry (SI), you are to:

a. Investigate and, if possible, determine the cause of the accident, together with any contributory, aggravating and other factors and observations.

b. Investigate and comment on relevant fatigue implications of an individual's activities prior to[2] the matter under investigation and on any Human Factors that may have played a part in this accident.

c. Ascertain whether Service personnel involved were acting in the course of their duties.

d. Examine what policies, orders and instructions were applicable and whether they were appropriate and complied with.

e. Determine the state of serviceability of relevant equipment, vehicle etc.

f. Determine if the Service kit was deficient or defective.

g. Establish the level of training, relevant competencies, qualifications and currency of the individual involved in the accident.

h. Identify if the levels of planning and preparation were commensurate with the activities' objectives.

i. Review the levels of authority and supervision covering the task during which the incident occurred.

j. Assess Health and Safety at Work and Environmental Protection implications in line with Joint Service Publications (JSP) 375 and JSP 418.

k. Investigate specialist requirements under single-Service regulations such as equipment maintenance.

l. Report and make appropriate recommendations to the Director General Defence Safety Authority (DG DSA).

2. The investigation should not seek to attribute blame and you should use JSP 832 Guide to Service Inquiries and DSA 03.10 as guidance for the conduct of your inquiry. You are to report immediately to the DG DSA should you have cause to believe a criminal or Service offence has been committed.

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[2] This may be for as short a period as the days just prior to the matter or for a prolonged period building up to the matter.

3. If at any stage the panel discovers something that they perceive to be a continuing hazard presenting a risk to the safety of personnel or equipment, the President should alert DG DSA without delay to initiate remedial actions. Consideration should also be given at this time to raising an Urgent Safety[3] notice.

[3] This could be an advice or a recommendation safety note.

Part 1.3

Narrative of events

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List of figures:

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Part 1.3 – narrative of events

All times are local (GMT plus 1 hour).

Synopsis

1.3.1. At approximately 10:24 on 21 June 2022, during a military exercise on Salisbury Plain Training Area (SPTA), a service person (SP) was run over by a reversing Combat Vehicle, Infantry Command, Tracked Warrior (FV511) from which they had just debussed (see figure 1.3.1).[1] The SP, Second Lieutenant (2Lt) Max George, from D Company, 5th Battalion The Rifles (5 RIFLES), was pronounced dead at the scene shortly afterwards.

Figure 1.3.1 – FV511 – equipment registration mark (ERM) [redacted]

1.3.2. The accident occurred during the Reconnaissance and Armoured Tactics Division's (RATD)[2] Exercise COMBAT SPIRIT (Ex CS). At the time of the accident, the FV511 (ERM [redacted]) was being commanded by a student commander. The exercise was the tactics phase and final module of the student commander's qualifying course. 2Lt George was supporting the exercise as a member of the Support to Experimentation and Training (SET)[3] troops.

Exhibit 47

[1] The crew and other occupants of Warrior used different procedures to exit the vehicle. Debussing referred to other occupants (colloquially referred to as 'dismounts') exiting the vehicle from the section working compartment; dismounting referred to the vehicle's crew exiting the vehicle via the front mounting step.
[2] RATD was resubordinated to the Combined Arms Manoeuvre School (CAMS) in July 2022.
[3] SET was resourced by the Field Army and provided assistance for a limited duration to support the delivery of essential training, events and trials.

Background

Exercise COMBAT SPIRIT

1.3.3. **Overview**. Ex CS was the final element of the combined tactics phase for the Armoured Infantry Platoon Commander Course (AIPCC), Armoured Infantry Crew Commander (AICC) Course, Challenger 2 (CR2)[4] Armoured Troop Leader Course and Armoured NCO Commander Course.[5] It was a formative[6] and summative[7] blank-firing tactical exercise conducted[8] by the RATD's Armoured Tactics Wing, which was based at Waterloo Lines, Warminster. The exercise tested students' suitability to become fully qualified and competent within their specific role (either an armoured infantry platoon commander, Warrior commander, armoured troop leader or CR2 commander). The FV511 involved in the accident was being commanded by a student[9] from the AIPCC who was being assessed as an armoured infantry platoon commander. The FV511 was assigned the callsign (C/S) 42A (and is referred to as C/S 42A from this point forward).

Exhibit 1
Exhibit 2
Exhibit 11
Witness 1
Witness 35

1.3.4. **Conduct**. The exercise started on 14 June 2022 and was due to complete on 23 June 2022. The students were drawn from various armoured and armoured infantry units. At the time of the accident there were 10 Warrior student commanders (six of whom were student armoured infantry platoon commanders) operating from eight Warriors, and 17 CR2 commander and gunner students operating from 11 CR2s. D Company, 5 RIFLES, provided the SET troops who supported the exercise. They formed an armoured infantry company, which the armoured infantry students integrated into, allowing them to fulfil their respective command appointments. An opposition force (OPFOR) for the exercising troops to target and attack during the exercise, was also formed from the SET troops. The Queen's Royal Hussars (QRH) provided the armoured squadron[10] for the armoured students to conduct their command appointments.

Exhibit 1
Exhibit 2
Exhibit 16

Key personnel involved

1.3.5. **Introduction**. In this report the service inquiry panel (referred to as 'the panel' from this point forward) will refer to individuals who played a role

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[4] CR2 was the Army's in-service main battle tank (MBT).
[5] Each course had four modules: communications, driving and maintenance, gunnery and tactics. The tactics phase was the final module.
[6] JSP 822 (V4.1 Nov 21) Pt1, Sect 10 – Glossary, page 246. 'Formative assessment - Also known as progress tests, these are administered at intervals during a training activity to gain data for feedback to trainees. They provide the basis for action to be taken by both parties to ensure trainee success'.
[7] JSP 822 (V4.1 Nov 21) Pt1, Sect 10 – Glossary, page 262. 'Summative assessment - Tests used to determine whether trainees have achieved the Training Objectives (TOs), or significant Enabling Objectives (EOs), which are deemed prerequisite to further training. They provide the required data to assign pass / fail grades and are conducted at the end of training or at the end of each stage / module of training. The outcome of the assessment is to determine whether the individual or team is competent to carry out the role or task without supervision'.
[8] Pamphlet No 21 Training Regulations for Armoured Fighting Vehicles, Infantry Weapon Systems and Pyrotechnics. Page 1-6, paragraph 1-10.b. 'Conduct (Conducting). This is the management of a live or blank firing exercise or practice within the approved plan'.
[9] JSP 822 (V4.1 Nov 21) Pt1, Sect 10 – Glossary, page 265. 'The term 'trainee' encompasses all those in the receipt of training across Defence, for both individual and collective training, and encompasses such terms as 'Recruit', 'Student', 'Learner', 'Officer Cadet', 'Exercising Troops' etc'.
[10] An armoured squadron consists of four troops, each with four CR2 tanks.

before, during and after the accident on 21 June 2022. Except for the deceased, names have been ciphered. An overview of those individuals is given in the following paragraphs.

1.3.6. **The RATD staff**. The RATD was the training provider (TP)[11] responsible for delivering the tactics courses and for the planning and safe conduct of Ex CS. The RATD exercise staff who were either present during the accident or played a key role in the management of the exercise are listed below: Witness 1 Exhibit 34

a. **Exercise conducting officer (ECO)**. The ECO joined the Army in 2007 and commissioned as a [redacted] officer. The ECO joined RATD in 2020 as the officer commanding (OC) Armoured Wing, responsible for the armoured aspects of training delivery. This was the sixth time they had conducted Ex CS as a member of the exercise staff. The ECO fulfilled the role of planning officer and ECO for Ex CS. The ECO was located several hundred metres to the west of the accident when it occurred, and did not witness the accident. Exhibit 7 Witness 3

b. **Assistant ECO (AECO)**. The AECO joined the Army in 1999. The AECO was a qualified Warrior commander and gunner, and regimental instructor gunnery (RIG) and joined RATD in 2020 as the Senior Staff Instructor (SSI) Armoured Infantry. They were the nominated AECO during Ex CS, responsible for the safe conduct of activity involving blank ammunition and pyrotechnics. The AECO was located approximately 100m to 150m to the west of the accident when it occurred, co-located with their relief (Observer 1) and Exercise Assistant 1 (EA1), and did not witness the accident. Exhibit 7 Witness 6

c. **EA1**. EA1 joined the Army in 2008. EA1 was a qualified Warrior commander, RIG and Warrior driving & maintenance instructor (DMI), and joined RATD in 2020 as the Staff Instructor (SI) Armoured Infantry. EA1 had conducted Ex CS on at least four occasions as part of the exercise staff prior to the accident. EA1 was an EA for Ex CS and was responsible for the safe conduct of activity involving blank ammunition and pyrotechnics, and also responsible for controlling the OPFOR. EA1 was located approximately 100m to 150m to the west of the accident when it occurred, co-located with the AECO and Observer 1, and did not witness the accident. Exhibit 7 Witness 9

d. **Observer 1**. Observer 1 joined the Army in 2007 and was a qualified Warrior driver, gunner, commander and DMI. During Ex CS Observer 1 was shadowing the AECO in preparation for joining the RATD staff later in 2022, and was located approximately 100m to Witness 8

[11] JSP 822 (V4.1 Nov 21) Part 1, Sect 10 – Glossary, page 270. 'Training Provider – The Training Provider is the training school, college, organisation, establishment or group that conducts either individual or collective training (or both)'.

150m to the west of the accident when it occurred, co-located with the AECO and EA 1, and did not witness the accident.

1.3.7. **5 RIFLES personnel**. D Company, 5 RIFLES (an armoured infantry battalion), was tasked to support Ex CS as SET troops on 25 April 2022.[12] They provided six FV510[13], two FV511, vehicle crews and dismount troops organised as an armoured infantry company, commanded by their regular company commander and supported by a Warrior sergeant major (WSM). Students fulfilled the roles of platoon commanders and Warrior commanders within the company. D Company also provided the OPFOR. The company was supported by a 5 RIFLES Royal Electrical and Mechanical Engineers (REME) fitter section which provided equipment support for the armoured infantry vehicles. A combat medical technician (CMT) operating from a FV432 (Bulldog) ambulance[14] provided medical support for the armoured infantry company. The 5 RIFLES personnel who were either present during the accident or played a role leading up to the accident are listed below: — Exhibit 16 Exhibit 53 Witness 13

a. **Company commander**. The company commander commissioned as an infantry officer in 2009 and assumed command of D Company in May 2020. During Ex CS the company commander was acting as the company commander of the armoured infantry company, operating from a Land Rover 'Fitted for Radio' (FFR)[15] with the WSM. The company commander was located approximately 50m to 60m to the east of the accident when it occurred, co-located with the WSM, and witnessed the accident. — Witness 11

b. **WSM**. The WSM joined the Army in 2001. The WSM was a qualified Warrior gunner, driver, commander and DMI, and assumed the role of WSM in D Company in April 2022. During Ex CS the WSM was fulfilling the role of the armoured infantry company's WSM and was located approximately 50m to 60m to the east of the accident when it occurred, co-located with the company commander, and witnessed the accident. — Witness 13

c. **Platoon Commander 1**. Platoon Commander 1 commissioned as an infantry officer in 2020. They joined D Company in 2021 as the platoon commander for 14 Platoon. Platoon Commander 1 was a qualified armoured infantry platoon commander. At the time of the accident, Platoon Commander 1 was acting as the company second-in-command (2IC) operating from the Bulldog ambulance, and did not witness the accident. — Witness 12

d. **OPFOR 1**. OPFOR 1 joined the Army in 2014. During Ex CS OPFOR 1 led a three-person team acting as part of the OPFOR. — Witness 28

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[12] The Army's Land Operations Command (LOC) allocated the SET task to the 3rd (UK) Division on 7 December 2021. 3rd (UK) Division allocated the task to 20th Armoured Brigade Combat Team (20 ABCT) on 7 April 2022, 20 ABCT nominated 5 RIFLES for the task on 25 April 2022.
[13] Combat Vehicle, Personnel Tracked, 30mm Gun, Warrior.
[14] A tracked armoured personnel carrier – ambulance variant.
[15] An FFR vehicle was one that had been adapted to carry additional communications equipment which was operated from the vehicle.

The team operated from a Land Rover with distinctive markings to identify them as 'enemy forces'. OPFOR 1 was located approximately 50m to 60m to the north-east of the accident when it occurred, co-located with the other two members of their team, and witnessed the accident.

1.3.8. **Combat Medical Technician (CMT)**. The armoured infantry company and the armoured squadron each had a CMT operating from Bulldog ambulances that provided medical support to their respective sub-units. Due to a technical issue with the armoured infantry company's Bulldog ambulance at the time of the accident, the CMT from the armoured squadron attended to the casualty. This CMT joined the Army in 2016. They were a qualified class 1 CMT and had completed the Battlefield Advanced Trauma Life Support (BATLS) course in January 2022. The CMT was not in the vicinity of the accident when it occurred, and did not witness the accident. Witness 12 Witness 15

1.3.9. **C/S 42A crew**. The crew of the Warrior[16] involved in the accident (C/S 42A) consisted of a student vehicle commander (Student Commander 1), a qualified driver (Driver 1) and a qualified gunner (Gunner 1). Student Commander 1 was also acting as the platoon commander. There were two people in the rear of the vehicle who could debus from the vehicle if required and operate in a dismounted role[17], one was 2Lt George who was acting as the platoon sergeant. The second person, (Dismount 1) was less clear about their role, but stated they were there to support 2Lt George in a dismounted role if required. Student Commander 1 assumed Dismount 1 was a deputy vehicle commander (DVC) who could assume command of the vehicle should the platoon commander / vehicle commander need to dismount from the vehicle and operate on foot. All, apart from Student Commander 1, were SET troops from 5 RIFLES. Witness 16 Witness 22 Witness 32 Witness 35

a. **Student Commander 1**. Student Commander 1 commissioned as an infantry officer in 2021 and joined the [redacted] in January 2022. Student Commander 1 started the AIPCC in March 2022, of which the Armoured Infantry Tactics Course was the final of four modules. Student Commander 1 had passed the first three modules (communications, gunnery and driving & maintenance). At the time of the accident Student Commander 1 was commanding C/S 42A. Exhibit 32 Witness 35

b. **Driver 1**. Driver 1 joined the Army in 2019 and qualified as a Warrior driver later that year. Driver 1 had taken part in Ex CS on three previous occasions, both as a dismount and as a Warrior driver. At the time of the accident Driver 1 was driving C/S 42A. Witness 32

c. **Gunner 1**. Gunner 1 joined the Army in 2015 and qualified as a Warrior gunner in 2020. Gunner 1 had taken part in Ex CS Witness 22

[16] A Warrior crew (commander, gunner and driver) were those who remained with the vehicle to operate it.
[17] Such people were referred to as 'dismounts' and were usually the element of the armoured infantry platoon that debussed from the vehicle when required to conduct dismounted close combat on the enemy position or other dismounted tasks.

previously as a dismount operating from a Warrior. At the time of the accident Gunner 1 was acting as the gunner in C/S 42A.

d. **Dismount 1**. Dismount 1 joined the Army in 2018. Dismount 1 was a qualified Combat Vehicle Reconnaissance (Tracked) (CVR(T)) driver, and Warrior gunner and commander (although had not conducted the AICC tactics module). At the time of the accident Dismount 1 was in the rear of C/S 42A and was the closest witness to the accident. Witness 16

e. **2Lt George (the deceased)**. 2Lt George joined the Army in January 2021 and commissioned as an infantry officer in December 2021. They completed the Platoon Commanders Battle Course (PCBC) in April 2022 prior to joining D Company, 5 RIFLES in May 2022. Throughout the exercise 2Lt George acted as a dismount, but not as a platoon commander as this role was fulfilled by the student platoon commanders on the AIPCC. At the time of the accident they were acting as a platoon sergeant, operating from the rear of C/S 42A with Dismount 1. Exhibit 2 Witness 35

Location

1.3.10. **SPTA**. Ex CS was being conducted on the SPTA in Wiltshire. It was the largest military training area in the UK, and the only one that enabled large scale armoured manoeuvre exercises. The area was used regularly by the RATD to conduct Ex CS. Exhibit 12

Figure 1.3.2 – Accident location

Vehicle history

Exhibit 3
Exhibit 4
Witness 11
Witness 13

1.3.11. **Warrior**. Warrior was a tracked armoured vehicle (AV) that supported the armoured infantry. There were six variants: Section (FV510),[18] Command (FV511), Repair (FV512), Recovery (FV513), Observation Post Vehicle (FV514) and Battery Command (FV515). The FV510's role as defined in the Warrior Concept of Use (CONUSE) document, was to 'provide section and platoon vehicles in the rifle company'[19] in armoured infantry battalions. At the time of the accident, due to a lack of vehicle availability, a FV511 was being used as the platoon commander's vehicle instead of a FV510.[20] The FV511 had a three-person dedicated crew: a commander and gunner that operated from the vehicle's turret, and a driver that operated in the driver's compartment. There was a section working compartment in the rear of the FV511 that had capacity for five people and fittings for additional communications equipment. The section working compartment was accessed through the rear bulkhead via two manually operated doors. The turret was either fitted with a Battle Group Thermal Imaging Sight (BGTI) or Raven sighting system. The FV511 involved in the accident was the type fitted with a Raven sighting system (see figures 1.3.3 and 1.3.4).

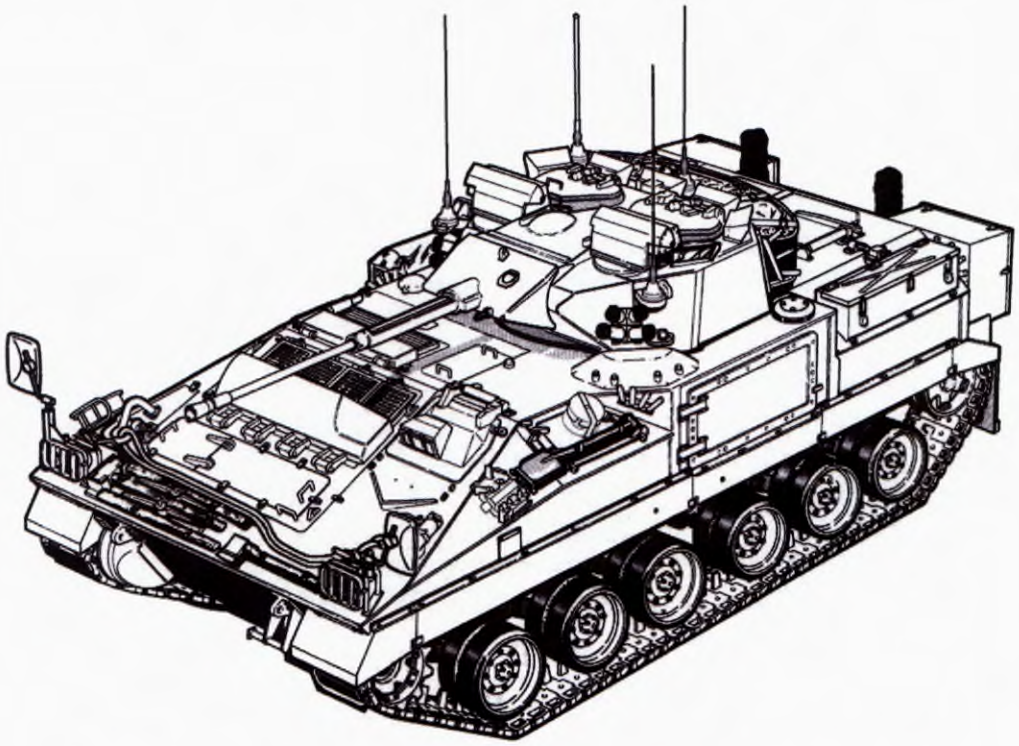

Figure 1.3.3 – FV511 (Raven) – three-quarter view (front left)

[18] The FV510 was referred to as a 'section' variant in the Warrior's CONUSE document, a 'personnel' and 'section' variant in the Army Equipment Support Publication (AESP 2350-T-201-201) and colloquially as a 'fighting vehicle' by its users.
[19] Concept of Use (CONUSE) Warrior Infantry Fighting Vehicle, dated 2 March 2015. Page 4, paragraph 15.a.(1).
[20] Platoon commanders ordinarily operated from FV510s in accordance with the CONUSE.

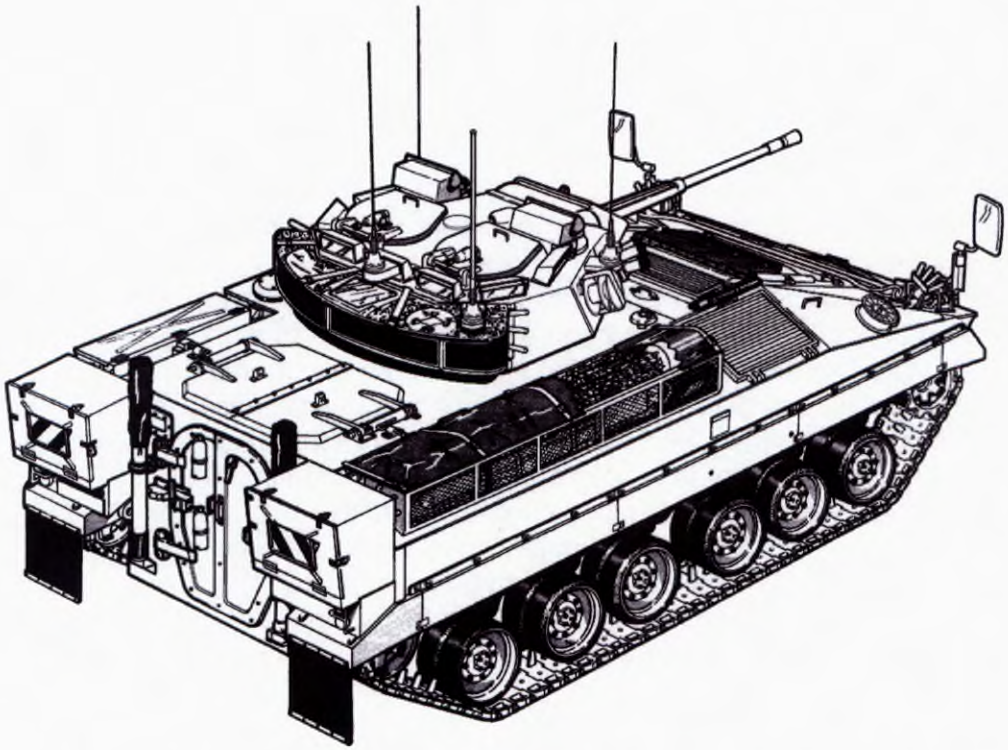

Figure 1.3.4 – FV511 (Raven) – three-quarter view (rear right)

1.3.12. **The FV511 involved in the accident**. The FV511 (ERM [redacted]) was part of 5 RIFLES' basic unit fleet (BUF).[21] The vehicle was transferred to 5 RIFLES on 9 February 2018 from 1st Battalion The Yorkshire Regiment (1 YORKS). It was further transferred several times between the companies within 5 RIFLES and on two occasions externally to other units (see table 1.3.1). It was transferred to D Company on 25 May 2022, 20 days prior to the start of Ex CS. It had undergone a mandated equipment inspection (MEI) in March 2022 and a commander's function test (CFT) on 27 May 2022. Numerous faults with the vehicle (21 in total) were recorded on the Joint Asset Management & Engineering Solutions (JAMES).[22] None of the faults had imposed a 'limited role' (LR)[23] on its ability to carry troops in the section working compartment or that rendered the vehicle 'non-taskworthy' (NT).[24] During Ex CS, the FV511 had been designated the C/S 42A.

Exhibit 5
Exhibit 6
Exhibit 13
Exhibit 17
Exhibit 81

[21] Field Army Training Directive 2022. Chapter 20, page 20-1, paragraph 20-02.d. Basic unit fleet (BUF). 'A BUF [was] a fleet of vehicles issued to and held by units. The holding unit [was] responsible for the maintenance and upkeep of their basic unit fleet.' BUFs were sized and shaped to deliver sub-unit (company) activity within the unit.
[22] JAMES was the engineering management information system used to record military equipment (including vehicles) engineering records.
[23] DSA03 DLSR-Equipment Standards Regulatory Schedule V 1.11-O Page ix. 'Limited Role (LR) – The equipment has identified or recorded faults that affect its full operational capability but NOT its safe or legal operation'.
[24] DSA03 DLSR-Equipment Standards Regulatory Schedule V 1.11-O Page ix. 'Non-Taskworthy (NT) – The equipment has identified or recorded faults that make it either unsafe or illegal to operate, or it is overdue certain maintenance tasks'.

Ser (a)	Receipt date (b)	Receipt holding unit (c)	Days held (d)
1	25 May 2022	5 RIFLES D Company	118
2	28 Apr 2022	5 RIFLES A Company	26
3	26 Jul 2021	5 RIFLES Trg Wing	275
4	26 Jul 2021	5 RIFLES	0
5	08 Dec 2020	1 FUSILIERS	229
6	03 Dec 2020	5 RIFLES Trg Wing	5
7	03 Dec 2020	5 RIFLES MT Platoon	0
8	29 Sep 2020	3 ACS Bn REME 20 Armoured Company	64
9	22 Jul 2020	3 ACS Bn REME	69
10	17 Jun 2020	5 RIFLES Trg Wing	34
11	21 Nov 2019	5 RIFLES D Company	209
12	08 Feb 2019	5 RIFLES A Company	286
13	21 Sep 2018	5 RIFLES B Company	139
14	22 Jun 2018	5 RIFLES D Company	91
15	17 May 2018	WR COMPANY 1	35
16	26 Apr 2018	5 RIFLES D Company	20
17	09 Feb 2018	5 RIFLES B Company	76
18	09 Feb 2018	5 RIFLES	0
19	09 Feb 2018	1 YORKS	0
20	07 Feb 2018	1 YORKS B Company	1
21	02 Feb 2018	1 YORKS	5

Table 1.3.1 – FV511 (ERM [redacted]) transfer history 2018 to 2022

Pre-accident events

1.3.13. **General**. Pre-accident events are bounded by the commencement of the exercise preparation conducted by D Company on 7 June 2022 to reveille at 05:00 on 21 June 2022.

1.3.14. **SET troops' preparation**. D Company conducted a two-day pre-Ex CS training programme at their barracks on 7 and 8 June 2022. The programmed activity included Armoured Vehicle Standing Orders (AVSOs) tests, Warrior safety briefs, vehicle preparation, emergency procedures briefs and the hand-over / take-over of vehicles. Prior to the start of the exercise, the Tactical Engagement System (TES)[25] was fitted to the vehicles. On 13 June 2022, equipment was loaded onto the vehicles and a final communications check was conducted. The exercise safety brief from the exercise action safety plan (EASP) was delivered to D Company by the company 2IC in barracks prior to deploying to the exercise area.

Exhibit 7
Exhibit 18
Witness 13

1.3.15. **SET troops' transit to the exercise area**. Vehicle crews had been allocated to vehicles by D Company's chain of command. Changes were

Exhibit 8
Witness 11

[25] TES was a laser-based simulation system that allowed dismounted and mounted soldiers to simulate the effects of direct and indirect fire. It used laser receivers and GPS transceivers worn on the body or attached to vehicles and lasers attached to real weapon systems. It indicated if a target had been hit and could be used to debrief students on their performance during After Action Reviews (AAR).

made to the crew lists immediately prior to departing for the exercise area due to some personnel not having in-date hearing tests.[26] D Company transited in their exercise vehicles from Ward Barracks, Bulford, to the exercise area on 14 June 2022. 2Lt George's departure to the exercise was delayed by 24 hours due to a mechanical issue with the vehicle they were travelling in.

Witness 13
Witness 27

1.3.16. **Exercise activity**

a. **Preliminary activity**. D Company, the RATD exercise staff and the students rendezvoused on 14 June 2022 at The Rookery, which was situated on the western edge of SPTA near Warminster, and conducted preliminary activity. This included the delivery of the exercise safety briefs to the students by the RATD's lead armoured infantry officer (SO3 Armoured Infantry), and students integrating into their nominated vehicles.

Exhibit 1
Witness 3

b. **Order of battle (ORBAT)**.[27] Armoured infantry company ORBATs normally consisted of a company headquarters (HQ) and three platoons (see figure 1.3.5); each platoon had four FV510s (three section[28] vehicles and the platoon commander's vehicle). Due to a lack of vehicles and personnel, D Company's ORBAT for Ex CS initially consisted of a company HQ and only two platoons, each with a FV511 as the platoon commanders' vehicle and three FV510s as the section vehicles. Students from the AIPCC and AICC integrated into the company ORBAT; AIPCC students rotated between platoon commander and Warrior commander appointments, whereas AICC students[29] remained as Warrior commanders throughout. The ORBAT and AIPCC student command appointments changed throughout the exercise to ensure the training objectives could be met and to provide sufficient opportunity to assess students in the role for which they were being assessed.

Exhibit 3
Exhibit 29
Witness 11
Witness 13

[26] Due to the risk of noise induced hearing loss (NIHL) from operating AV, including Warrior, measures had been put in place to reduce the risk and monitor those at risk. One such measure reflected in Safety Notice via Email (SNvE) - 20220503-ISSUE_SNvE_1429_Tracked_Platform_Noise_Usage_Limitations_Update-O (page 6, paragraph 11.a.) which was issued in February 2022. It stipulated 'All crew / maintainers MUST be in date for their routine audiometry assessment before recommencing exposure to [Warrior]'.

[27] ORBATs describe the identification, strength, command structure, and disposition of the personnel, units, and equipment of a military force.

[28] A section consisted of six soldiers.

[29] AICC students were junior non-commissioned officers (JNCO) who were training to become Warrior commanders.

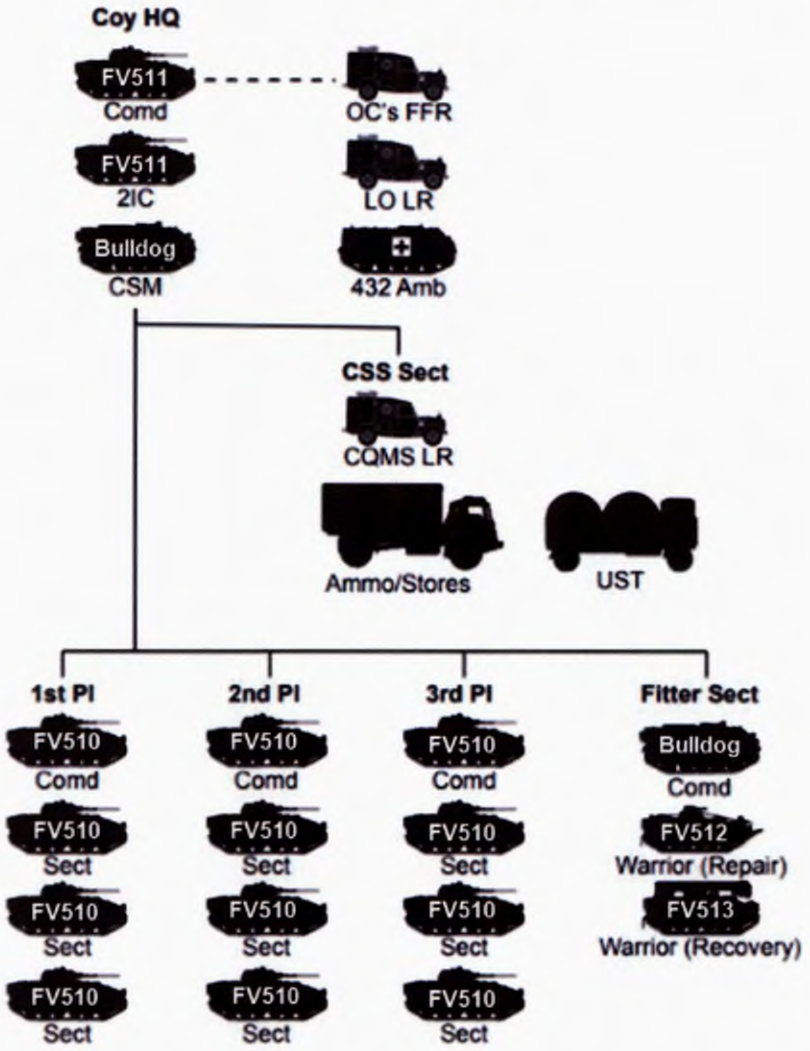

Figure 1.3.5 – Armoured infantry company order of battle (ORBAT)[30]

c. **14 to 17 June 2022 (days 1 to 4)**. The initial phase of the exercise focused on low-level tactics, gradually progressing from platoon to company level actions with armoured support. The pace of the exercise had been planned to be commensurate with the learning progression and experience of the students. It was interspersed with periods of instruction, demonstrations and student feedback. At one point during this period the exercise staff stopped the exercise when a dangerous practice was witnessed. It involved a dismounted soldier adopting a kneeling position behind a Warrior; this was in a blind spot to the vehicle's crew and there was a risk the vehicle could have reversed over them. The exercise staff and D Company's chain of command reminded exercising troops on the safety aspects of operating in and around AVs to prevent a reoccurrence of the dangerous practice.

Exhibit 1
Exhibit 2
Witness 3
Witness 4
Witness 6
Witness 8
Witness 13

[30] Army Field Manual - Warfighting Tactics Part 4: Battlegroup Tactics. Page 1-3 figure 1-1.

d. **18 June 2022 (day 5)**. On 18 June 2022 the course entered Copehill Down Village (an urban training facility on SPTA). The day was dedicated to vehicle maintenance, enforced rest for the vehicle crews and periods of instruction for the students. The students also received an AAR and were briefed on the salient learning points from the previous four days' actions.

Exhibit 1
Exhibit 2
Witness 3

e. **19 and 20 June 2022 (days 6 and 7)**. The exercise increased in complexity following the maintenance day. The armoured and armoured infantry elements combined to form a combined arms company. They conducted urban attacks in Copehill Down Village and in Imber Village (another urban training facility on SPTA). On completion of the urban phase the company conducted a number of actions, including an obstacle-crossing, advance to contact[31] and an attack.

Exhibit 1
Exhibit 2
Witness 3

1.3.17. **Previous evening (20 June 2022)**. On completion of the tactical actions on 20 June 2022, the company moved into hides[32] at Halfmoon Copse.[33] Hides were established by 19:00. Camouflage nets were erected over vehicles and personnel carried out personal and vehicle administration (feeding, rest, equipment checks, weapon cleaning).

Exhibit 2
Witness 11
Witness 13

a. **Vehicle running checks – after use**.[34] Once the hides had been established, vehicle crews conducted 'after use' checks on their vehicles. Driver 1 completed the 'after use' check on C/S 42A.

Witness 32

b. **Appointment changes**. Command appointments changed, Student Commander 1 was appointed as a platoon commander and was allocated C/S 42A as the platoon commander's vehicle. Student Commander 1 assumed command of the vehicle the following morning. 2Lt George had opted to act as the platoon sergeant in C/S 42A. The RATD staff, company commander and WSM were not aware that 2Lt George was acting as a platoon sergeant and had assumed there were no dismounts in C/S 42A.

Witness 6
Witness 11
Witness 13
Witness 35

c. **ORBAT change**. Students received orders for the following day's planned actions from the company commander. A decision had been taken by the company commander, and agreed by the RATD staff, that the company would operate as a three-platoon company the following day. This allowed for a reserve platoon to be formed to enable the company to practice in the use of a reserve element to assault further enemy positions. As there were

Witness 4
Witness 6
Witness 11

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[31] Advance to contact seeks to gain or regain contact with an enemy under the most favourable conditions. It was normally executed in preparation for subsequent offensive activity.
[32] Mounted Close Combat Training Vol 1 – All Arms Fieldcraft and AV Battle Drills, page 2-1, Chapter 2, Section 1 – Hides and Harbours, explained a hide was a temporary location used to observe, re-group, give orders and conduct maintenance, rest and administration.
[33] Sometimes referred to as 'Half Moon Wood'.
[34] Checks were undertaken on the vehicle after its use in accordance with AESP 2350-T-200-601 Combat vehicle, Tracked, Warrior® Bowman, Common Items, Maintenance Schedule. If in continuous use, the check was to be carried out at least once in every 24 hours.

insufficient vehicles to form three complete platoons, the reserve platoon consisted of two vehicles and the other two platoons were reduced to three vehicles in which to conduct their attacks. The reserve, if used, would need to be bolstered by a vehicle from another platoon.

d. **Ex CAMBRIAN PATROL training**. During the evening of 20 June 2022, 2Lt George took part in a training serial in preparation for the forthcoming Ex CAMBRIAN PATROL.[35] The training was led by Platoon Commander 1. It was not an Ex CS activity but had been approved by the chain of command. It consisted of navigational and physical training. The training serial finished at approximately 23:00. — Witness 11, Witness 12

e. **Night routine**. During that evening there were no other activities. Drivers were rested. Student platoon commanders also rested apart from conducting approximately two hours of radio monitoring each throughout the night. — Witness 32, Witness 35

Accident events

1.3.18. **General**. The accident events are bounded by activity on 21 June 2022 (day 8) between approximately 05:00 (reveille) to 'stop, stop, stop'[36] being called at approximately 10:25.

1.3.19. **Reveille**. Reveille was at 05:00. Personnel conducted their personal administration and the driver of C/S 42A conducted the 'running checks – before use'[37] on C/S 42A. Student Commander 1 assumed command of the vehicle. — Witness 22, Witness 35

1.3.20. **Advance to contact**. The company departed from the hide location at approximately 07:00 to conduct an 'advance to contact' with the CR2 in support. Warrior crews were 'closed down' for the advance to contact.[38] Two objectives had been planned for the morning (see figure 1.3.6). Objective 1 consisted of the woods at Ablington Furze and The Wig. Objective 2 consisted of three woods at Haxton O. — Exhibit 1, Exhibit 2, Witness 3, Witness 4, Witness 6, Witness 9

[35] Ex CAMBRIAN PATROL was an Army sponsored event. It was a challenging exercise and assessment designed to improve operational capability. The exercise was open to Regular and Reserve units and international teams.
[36] In accordance with the EASP a 'stop, stop, stop' call was to be made on all radio nets in the event of an incident to stop all activity.
[37] Checks were undertaken on the vehicle before its use in accordance with AESP 2350-T-200-601 Combat vehicle, Tracked, Warrior® Bowman, Common Items, Maintenance Schedule.
[38] Crews could operate with hatches locked open with heads protruding from the vehicle, this allowed for greater situational awareness, but afforded less protection. When tactical situations dictate, crews operated 'closed down' with hatches closed; this afforded greater protection, but due to restricted fields of view through the periscopes, situational awareness was reduced.

Figure 1.3.6 – Advance to contact trace

1.3.21. **Objective 1**. At approximately 08:30, on the route to the first objective, the company conducted obstacle crossings at the 'C' and 'C1' crossing points. They then moved to a forming up point (FUP)[39] in preparation to commence the attack on Objective 1. The exercise staff noted that temporary livestock pens had been erected between the FUP and the objective, so decided to cancel the first attack. To allow the OPFOR to reposition themselves from Objective 1 to Objective 2, a simulated air threat was imposed which forced the company to remain static in a hide. Once the OPFOR relocated, the air threat was lifted, and the company continued its advance towards the FUP for the second objective at Haxton O.

Exhibit 1
Exhibit 10
Witness 3
Witness 4
Witness 6
Witness 8
Witness 9

1.3.22. **Objective 2**

a. **Objective established**. By approximately 09:30, EA1 had positioned the three OPFOR teams, each in a Land Rover, at Haxton O. At 09:45 EA1 noticed a civilian walking close to the exercise area to the west of the objective. EA1 approached the civilian to warn them of the potential danger due to the presence of AVs and subsequently guided them away from the objective. EA1 then moved to the western side of the objective (see figure 1.3.7).

Witness 9

[39] The FUP was the last position occupied by the assault force before crossing the line of departure to commence an attack.

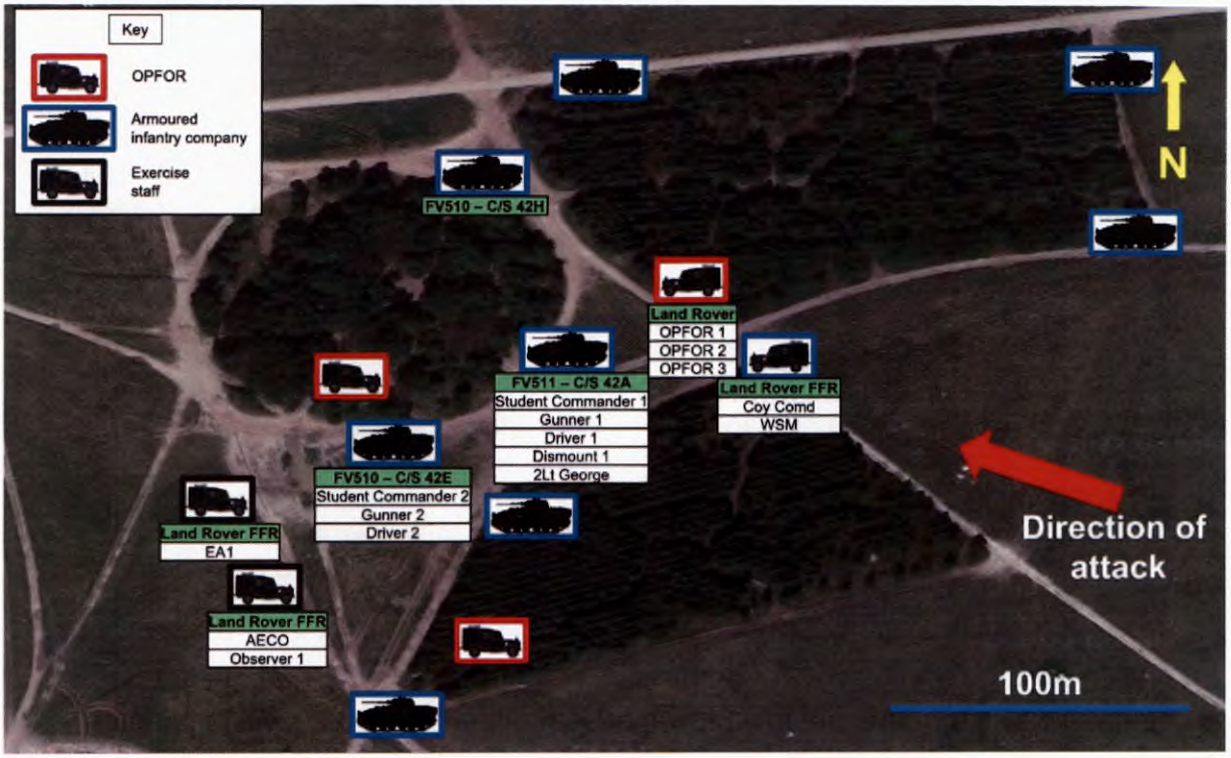

Figure 1.3.7 – Objective 2 – Haxton O

b. **Initial positions**. At approximately 10:06, the armoured squadron's CR2s departed the FUP in advance of the armoured infantry company. They swept through Haxton O engaging the OPFOR and formed a defensive line beyond the objective to allow the armoured infantry company to attack the OPFOR in the three woods. At approximately 10:07, the armoured infantry company left the FUP to attack the OPFOR positions at Haxton O. The OPFOR positions in the north-eastern and southern woods were attacked first. The attack on those two positions was complete by 10:20. Once the OPFOR had been attacked and defeated, they returned to their Land Rovers and took no further part in the attack. During this period, pyrotechnics being used by the exercising troops had inadvertently started two fires in the foliage. The AECO extinguished both fires and then moved to the western side of the objective, co-located with EA1, both remained in their Land Rover FFRs to observe the final part of the attack at Haxton O.

Exhibit 9
Witness 6
Witness 28

c. **Depth position – the approach**. A further OPFOR position was identified in the western circular wood at Haxton O. This became the target for Student Commander 1's platoon. As C/S 42A approached the target, the AECO noticed the commander and gunner hatches were not secured, presenting a safety hazard. The AECO instructed Student Commander 1 over the Bowman radio[40] to secure the hatches either in the open or closed position. Student

Exhibit 10
Witness 6

[40] Bowman was the in-service military communication information system (radio).

Commander 1 secured the commander's hatch in the closed position. The gunner's was secured in the open position as it could not be secured in the closed position due to a mechanical issue.

d. **Depth position – the attack**. At approximately 10:20, C/S 42A's platoon commenced the attack on the third wood. A section debussed from a FV510, C/S 42E, at the southern end of the wood and another section debussed from a FV510, C/S 42H, at the northern end. Both sections simultaneously swept through the wood to clear it of enemy forces, C/S 42E's section from south-east to north-west and C/S 42H's section from east to west. As the sections cleared the wood, the company commander who was positioned approximately 60m to the east, noticed that the sections were in danger of engaging each other. In order to prevent a 'blue-on-blue'[41], the company commander suggested over the Bowman radio to Student Commander 1 that they may want to place someone on the ground to coordinate the two dismounted sections. Student Commander 1 acknowledged the suggestion and decided to deploy 2Lt George, as the platoon sergeant, to co-ordinate the two dismounted sections.

Exhibit 9
Witness 11
Witness 35

1.3.23. **Debussing from C/S 42A**

a. **Brief to debus**. Student Commander 1 gave a verbal brief of the intent to deploy 2Lt George to co-ordinate the dismounted sections. Dismount 1, who was co-located with 2Lt George in the section working compartment of C/S 42A, could not recall hearing the brief. At approximately 10:23, Student Commander 1 gave the command for the vehicle to halt. As it halted, a further command was given for 2Lt George to debus. Dismount 1 was alerted when the vehicle braked and asked the commander for clarification of the command. The command to debus was reiterated by Student Commander 1 and by Gunner 1. Student Commander 1 only intended to debus 2Lt George and not Dismount 1. Dismount 1 was not aware of this and was also intending to debus immediately after 2Lt George.

Exhibit 9
Witness 16
Witness 22
Witness 32
Witness 35

b. **Debussing procedure**. As C/S 42A halted, Gunner 1 threw a smoke grenade to screen-off the debussing dismount from the OPFOR's view. Approximately 5-10 seconds after stopping, C/S 42A's rear doors were manually opened by the two dismounts. 2Lt George exited the vehicle and was seen to momentarily struggle either with a daysack or trying to free the radio antenna which may have snagged on the vehicle's rear door opening. They then went to grab their weapon, which was still inside the vehicle. Simultaneously, Student Commander 1 commanded Gunner 1 to traverse C/S 42A's turret to the right in the direction of the enemy. Once the turret

Exhibit 9
Witness 11
Witness 13
Witness 16
Witness 22
Witness 28
Witness 32
Witness 35

[41] The term 'blue-on-blue' was used to denote an (inadvertent) attack by a military force on members of its own side. The expression derives from the use of blue on maps to designate one's own forces.

completed its traverse, Student Commander 1 checked through the periscopes and could no longer see the open doors or 2Lt George at the rear of the vehicle. Student Commander 1 waited for a few more seconds to allow for the dismount to move clear of the rear of the vehicle.

c. **Vehicle reverses**. At approximately 10:24, believing the dismount was clear, Student Commander 1 commanded Driver 1 to reverse. Driver 1 selected reverse and reversed C/S 42A at speed in line with the practice of 'jockeying'.[42] 2Lt George was still at the rear of C/S 42A and was reaching for their weapon, which was in the vehicle when it reversed. The reversing FV511 knocked 2Lt George to the ground, who was then run over by the vehicle's left-hand track. Dismount 1 had not managed to debus and remained in C/S 42A. The time from C/S 42A stopping to reversing was approximately 38-43 seconds (based on the telemetry from the TES equipment fitted to C/S 42A – Exhibit 9). Attempts were made by those who witnessed the accident unfold (Dismount 1, OPFOR 1, 2 and 3, company commander and WSM) to warn of the impending danger. Dismount 1 shouted to C/S 42A's driver and commander, members of the OPFOR waved their hands and sounded their Land Rover's horn and the company commander transmitted a warning over the radio.

Exhibit 9
Witness 11
Witness 13
Witness 16
Witness 19
Witness 23
Witness 28
Witness 32
Witness 35

1.3.24. **Immediate response**. Driver 1 stopped the vehicle on seeing 2Lt George's body on the ground (see figure 1.3.8). At approximately 10:25, those who realised what had happened (Student Commander 2, company commander and the AECO) sent 'stop, stop, stop' calls to the exercising troops using Bowman radios, and to the exercise staff on the exercise command and safety radio net using civilian hand-held radios. At this point, all exercise activity ceased to allow for the post-accident management.

Witness 6
Witness 11
Witness 32
Witness 40

[42] Mounted Close Combat Training – Volume 1 Individual Training page 44, paragraph 0405. '**Jockeying**. If a vehicle remains in one location for too long giving covering fire to enable another AV to move, it is more likely to be acquired and destroyed by enemy fire. A commander may therefore choose to rapidly adjust their fire position after a few rounds. Jockeying is the term used to describe the manner in which an AV moves locally from one fire position to another on the same bound or battle position, in order to deal with a range of circumstances or tactical requirements. During jockeying, the AV should reverse out of sight keeping its frontal armour in the most likely direction of the enemy.'

Figure 1.3.8 – Accident site (approximate positions)

Post-accident events

1.3.25. **General**. The post-accident events are bounded by activity on 21 June 2022 between approximately 10:25 when 'stop, stop, stop' was called to the arrival of the emergency services and life extinct being declared at approximately 10:58.

1.3.26. **Initial assessment**. OPFOR 1 and EA1 arrived at the scene within seconds of the accident. Based on their observations, they assessed the casualty was dead and nothing could be done to resuscitate them. EA1 informed the exercise staff over the exercise command and safety net, that the casualty was 'T4'.[43]

Witness 9
Witness 28

1.3.27. **Call to emergency services**. At 10:26, Observer 1 called the emergency services on 999 using their personal mobile phone and requested assistance. The call lasted for approximately 20 minutes. During this time they were transferred to an ambulance service paramedic who gave advice based on the information given by Observer 1 and the CMT. The AECO called range control to report the incident.

Exhibit 61
Exhibit 62
Exhibit 74
Witness 8

1.3.28. **Medical assessment**. At approximately 10:34, the armoured squadron's Bulldog ambulance with their CMT on board, arrived at the accident site (the armoured infantry's Bulldog ambulance was unable to

Exhibit 2
Exhibit 61
Exhibit 62

[43] NATO had standardised the triage categorisation of casualties (T1 to T4). 'T4' was often used to describe a casualty that is dead, as was meant in this instance. The correct definition of a T4 casualty was 'Patients expected to die'. Allied Joint Publication-4.10, Allied Joint Doctrine for Medical Support page C-2.

move to the accident site due to a technical issue with the vehicle's communications system).[44] The CMT assessed the casualty and used a Tempus Pro monitor[45] to support an on-site diagnosis. No vital signs were detected. They also consulted with the paramedic that Observer 1 was communicating with on the mobile phone. At approximately 10:42 the ambulance service paramedic confirmed to the CMT that based on the information received, CPR should be withheld as it was not in the casualty's interest and attempts to conduct CPR would be 'futile'. | Witness 12
Witness 15

1.3.29. **Air ambulance**. At approximately 10:58, an air ambulance arrived at the scene and the on-board doctor certified the casualty dead. The air ambulance departed immediately after. | Exhibit 2
Exhibit 14

Cause of death

1.3.30. The cause of death offered to HM Coroner for Wiltshire and Swindon was listed on the Cause of Death form as: 'Multiple traumatic injuries'. | Exhibit 15

Accident timeline

Ser (a)	Date (b)	Time* (c)	Event (d)
1	Aug 21	-	RATD submit bid for SET to support Ex CS
2	7 Dec 21	-	LOC issued SET task to 3rd (UK) Division
3	14 Mar 22	-	AIPCC commences (ARMCEN, Bovington)
4	7 April 22	-	3rd (UK) Division allocate SET task to 20 ABCT
5	25 April 22	-	20 ABCT allocate SET task to 5 RIFLES
6	30 May 22	07:45	Armoured infantry Tactics Course commences (Waterloo Lines, Warminster)
7	7-8 Jun 22	-	D Company conduct pre-exercise preparation (Ward Barracks, Bulford)
8	14 Jun 22	14:00	Ex CS commences (The Rookery, SPTA)
9	18 Jun 22	-	Maintenance day (Copehill Down Village, SPTA)
10	20 Jun 22	19:00	Armoured infantry company established in hides (Halfmoon Copse, SPTA)
11		23:00	2Lt George completes training serial for Ex CAMBRIAN PATROL
12	21 Jun 22	05:00	Reveille – Student Commander 1 assumes command of C/S 42A
13		07:00	Armoured infantry company depart Halfmoon Copse
14		07:00	Armoured infantry commenced advance to contact towards Objective 1
15		08:30	Obstacle crossing conducted over C and C1 crossing points
16		-	First objective site cancelled due to livestock pennings
17		-	Advance to contact delayed to allow the OPFOR to relocate
18		09:30	OPFOR established at Haxton O objective
19		09:45	EA1 escorts a civilian walker away from the exercise area
20		10:00	Attack commences on Haxton O objective
21		10:20	First two of three woods cleared by armoured infantry company
22		10:20	C/S 42A's platoon commences attack on third wood

[44] AVs are not permitted to move if the communication system fails and the crew members cannot communicate with each other.
[45] The Tempus Pro was a lightweight, rugged portable device that monitors vital signs.

Ser (a)	Date (b)	Time* (c)	Event (d)
23		10:23	Student Commander 1 gives command for 2Lt George to debus
24		10:24	Student Commander 1 gives command to Driver 1 to reverse
25		-	Driver 1 reverses C/S 42A, which runs over 2Lt George
26		-	Driver 1 notices body and stops C/S 42A
27		10:25	'Stop, stop, stop' called on all radios
28		10:26	Casualty assessed as T4 by exercise staff
29		-	Observer 1 calls emergency services on 999
30		10:34	CMT arrives on scene and assesses casualty
31		10:42	Ambulance service paramedic advises not to conduct CPR
32		10:58	Air ambulance arrives on scene
33		10:59	Air ambulance doctor confirms 2Lt George's death

* Times are approximate.

Table 1.3.2 – Accident timeline

Part 1.4

Analysis and findings

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Table of contents – Part 1.4

List of figures:

List of tables:

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Part 1.4 – Analysis and findings

All times are local (GMT plus 1 hour).

Methodology

References

1.4.1. All references used during the investigation were current at the time of the accident or the related activity preceding the accident. Some references may now have been superseded or updated.

Analysis framework

1.4.2. The framework used for the analysis during the investigation focused on several components, as outlined in figure 1.4.1. The components were drawn from the defence lines of development (DLODs),[1] a checklist ordinarily used for the delivery of capability to ensure all key factors are considered, and the elements from the safe system of work (SSW) as defined in Joint Service Publication (JSP) 375 (Management of Health and Safety in Defence).[2] The rationale for the selection of these components was to ensure that the investigation systematically analysed all relevant factors, and that any subsequent recommendations were attributed to the correct authority for implementation. Whilst the framework used these headings, they were not necessarily followed slavishly and doctrinally, this was in order to not constrain the investigation. The following briefly outlines the focus of each component:

Exhibit 39

a. **Information / doctrine**. Relevant publications, information sources and doctrine were examined to determine if there were any factors that may have contributed to the accident. This included doctrine publications, standing orders, training documentation and Army Equipment Support Publications (AESPs).

b. **Organisation**. This component focused less on force structures, but more on the organisational collective issues that may have contributed to the accident.

c. **Personnel / people**. The inquiry examined those people who were directly involved in the accident, including the deceased, and those who had a role in planning, conducting, supporting and supervising the exercise to determine if they were 'safe people' as defined in JSP 375.[3] It also examined those who delivered instruction of certain procedures to ensure they met the minimum mandated training requirements as defined by JSP 822,[4] and were

Exhibit 19
Exhibit 39

[1] DLODs: training, equipment, personnel, information, doctrine, organisation, infrastructure, logistics (acronym TEPIDOIL).
[2] JSP 375 Volume 1. Chapter 40, page 2, paragraph 3-4. Safe system of work: safe people, safe equipment, safe place and safe practice.
[3] JSP 375 Volume 1. Chapter 40, page 5, paragraph 27.
[4] JSP 822 (V4.1 Nov 21). Page 129, paragraph 12.

current and competent instructors as defined by the relevant subject policy.

d. **Infrastructure / place**. The analysis of the infrastructure component sought to determine if the Salisbury Plain Training Area (SPTA) where the accident occurred, was a 'safe place' as defined in JSP 375,[5] and if there were any factors that may have contributed to the accident. Exhibit 39

e. **Equipment / logistics**. The analysis of equipment used during the exercise, either directly involved in the accident or supporting the exercise, sought to determine if it was 'safe equipment' as defined in JSP 375,[6] if it was being used within its safe operating envelope as determined by the safety case,[7] and if the safety case demonstrated risks to life associated with the equipment were as low as reasonably practicable (ALARP) and tolerable.[8] The investigation also examined the associated logistical support to determine any factors that may have impacted on the safety of the equipment. Exhibit 39

f. **Training / practice**. Analysis of the courses and training delivered to the Armoured Infantry Platoon Commander Course (AIPCC) students who were participating in the exercise when the accident occurred. The analysis focused on the analysis, design, delivery and assurance stages of the training against the guidelines in JSP 822 - Defence Direction and Guidance for Training and Education. The analysis of the practices and procedures used by those involved in the accident were assessed to determine if they were 'safe practices' as described in JSP 375.[9] Those recognised 'safe practices' as laid down by the service authorities were themselves examined to determine if the associated risks were ALARP. Exhibit 19 Exhibit 39

[5] JSP 375 Volume 1. Chapter 40, page 5, paragraph 27.
[6] JSP 375 Volume 1. Chapter 40, page 2, paragraph 4.b.
[7] JSP 375 Volume 1. Chapter 40, page 3, paragraph 9. Safety Case - A structured argument, supported by a body of evidence that provides a compelling, comprehensible and valid case that a system is safe for a given application in a given operating environment.
[8] hse.gov.uk. ALARP. Reasonably practicable involves weighing a risk against the trouble, time and money needed to control it.
[9] JSP 375 Volume 1. Chapter 40, page 6, paragraph 31.

Figure 1.4.1 – Analysis framework

Health and safety legislation

1.4.3. Health and safety legislation required all activities to be conducted within a SSW.[10] JSP 375 provided the MOD with the direction and guidance on meeting legal health and safety obligations and set out the arrangements for the day-to-day management of health and safety within defence, which included the SSW and the safe system of training (SST). The panel used the SSW and SST as part of the framework for their analysis of the factors relevant to the accident. Exhibit 39

a. **Safe system of work (SSW)**. All military SSW consisted of a common format which was broken down into four parts:[11] Exhibit 39

(1) **Safe persons**. 'Those considered as a competent person, who have also been given the appropriate information, instruction, and supervision to enable them to carry out a specific activity.'

[10] JSP 375: Management of Health and Safety in Defence. Volume 1, chapter 40, page 2, paragraph 3.
[11] JSP 375: Management of Health and Safety in Defence. Volume 1, chapter 40, page 2, paragraph 4.a. to 4.d.

(2) **Safe equipment**. 'This is equipment brought formally into service together with the associated documentation and underpinned by a safety case to ensure its safe use by a competent person. Where no safety case exists, any equipment hazards should then form part of the activity specific risk assessment.'

(3) **Safe place**. 'This is the space to be occupied by the military for the conduct of their activities and includes any surrounding areas together with any military or civilian population which might be affected by those activities. The safe place should form part of the activity specific risk assessment taking into account the proposed use of the space and controls put in place.'

(4) **Safe practice**. 'This covers the safe conduct of any activity and, unless conducted within the SST, should be risk assessed in detail and include any hazards arising from the use of the equipment, in the specific location, by competent persons, to ensure that risks to life (RtL) remained ALARP.'

b. **Safe system of training (SST)**. 'The SST takes into account that those under training are not yet competent but sets the conditions under which their training is to be conducted, ensuring they are provided with the appropriate information, instruction and supervision.'[12] It consisted of the same generic elements as the SSW: safe persons, safe equipment, safe place and safe practices. Exhibit 39

Human factors (HF) considerations

1.4.4. A psychologist from the Army Personnel Research & Consultancy (Directorate of Personnel, Army Headquarters), provided HF specialist support to the service inquiry. This included participation in witness interviews and advice to the panel throughout the investigation. A separate HF report was produced, which was considered in the analysis of events. A copy of the report is at annex A. Exhibit 158

Technical report

1.4.5. In support of the service inquiry, the accident vehicle was independently inspected after the accident, and the Defence Accident Investigation Branch (DAIB) compiled a technical report of the vehicle based on that inspection. The findings from that report were used to inform the service inquiry's analysis. A copy of the report is at annex B. Exhibit 44

[12] JSP 375: Management of Health and Safety in Defence. Volume 1, chapter 40, page 2, paragraph 6.

Accident factors

1.4.6. Once an accident factor had been determined to have been present it was then assigned one of the following categories:

a. **Causal factors**. Causal factors are those factors which, in isolation or in combination with other causal factors and contextual details, led directly to the accident. Therefore, if a causal factor was removed from the accident sequence, the accident would not have occurred.

b. **Contributory factors**. Contributory factors are those factors which made the accident more likely to happen. That is, they did not directly cause the accident. Therefore, if a contributory factor was removed from the accident sequence, the accident may still have occurred.

c. **Aggravating factors**. Aggravating factors are those factors which made the final outcome of the accident worse. However, aggravating factors do not cause or contribute to the accident. That is, in the absence of the aggravating factor, the accident would still have occurred.

d. **Other factors**. Other factors are those factors which, whilst shown to have been present played no part in the accident in question but are noteworthy in that they could contribute to or cause a future accident. Typically, other factors would provide the basis for additional recommendations or observations.

e. **Observations**. Observations are points or issues identified during the investigation that are worthy of note to improve working practices, but which do not relate to the accident being investigated and which could not contribute to or cause future accidents.

Probabilistic language

1.4.7. The probabilistic terminology detailed in table 1.4.1 clarifies the terms used in this report to communicate levels of certainty. It is terminology used by the DAIB and designed to facilitate standardised communication of certainty in Defence Safety Authority (DSA) accident and incident reporting.[13]

Exhibit 147

[13] 20160401-DAIB SOP 501-Overview of DAIB and Service Inquiry Reports. Page 4, paragraph 10. Viewed 9 February 2023.

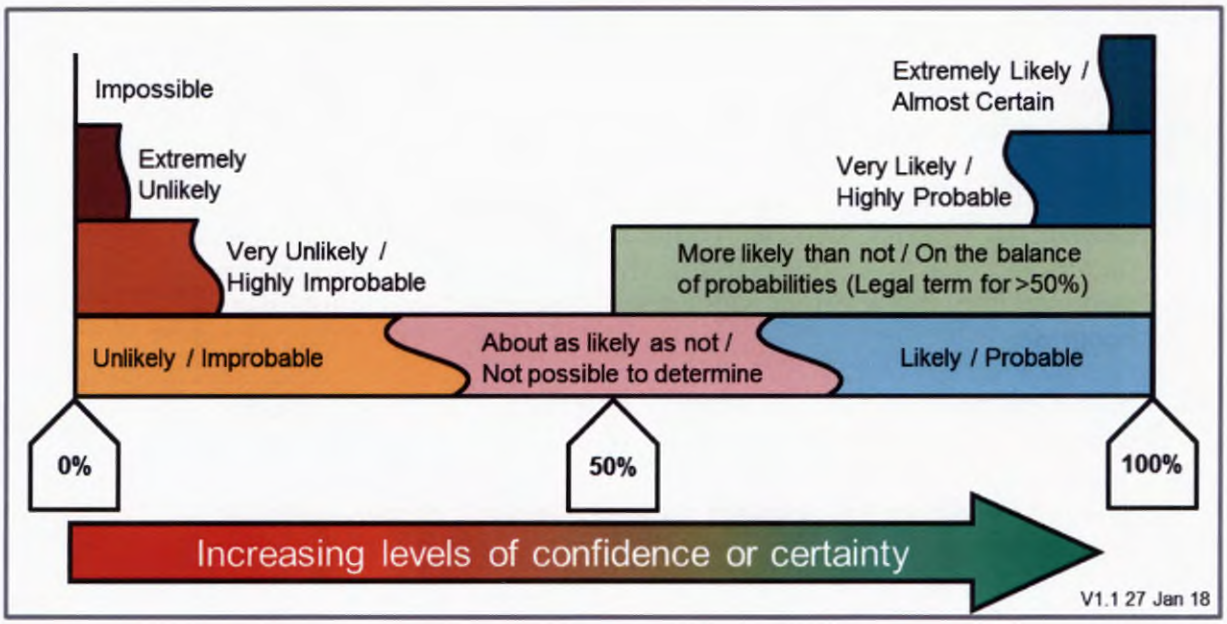

Table 1.4.1 - DAIB probability terminology table

Definition of 'should'

1.4.8. This report makes a number of recommendations. The term 'should' in those recommendations, is used in line with the definition contained within JSP 375 - Management of Health and Safety in Defence:

'Should - Means that the action is not a compulsory requirement but is a recommendation of good practice to comply with the policy.'[14]

Exhibit 136

[14] JSP 375 Master Glossary V1.1. August 2022. Page 15.

Section 1 - Information / doctrine

General

1.4.9. JSP 375 stated: 'The safe system of training (SST) takes into account that those under training are not yet competent but sets the conditions under which their training is to be conducted, ensuring they are provided with the appropriate information, instruction and supervision.'[15] Exhibit 39

1.4.10. This section examines the information and doctrine that underpinned the 4 elements of the SST (safe persons, safe equipment, safe place, safe practice) that were relevant to this accident.

1.4.11. The sources of information examined in this section contained the endorsed rules and procedures that governed a particular aspect of the accident or activity preceding it. They were valid at the time of the activity, however, many have since been updated.

1.4.12. **Definitions**:[16] Exhibit 142

a. '**Information**. Describes the provision of a coherent development of data, information and knowledge requirements for capabilities and all processes designed to gather, handle data and exploit information and knowledge. Data is defined as raw facts, without inherent meaning, used by humans and systems. Information is defined as 'data placed in context'. Knowledge is information applied to a particular situation.'

b. '**Doctrine**. Doctrine represents the enduring principles that guide military forces in their actions, as well as a codification of existing best practice. It is authoritative, but requires judgement in application.'

Information / doctrine - executive summary

1.4.13. The publications, orders and doctrine that governed the training, operation and equipment support of armoured vehicles (AV), and armoured infantry doctrine were contained in multiple sources of information. Some publications were dated, and lacked consistency and coherency. Some information was repeated across a spectrum of publications, leading to difficulty in determining which was the authoritative and correct source of information. Some of those who needed the correct and authoritative information had difficulty in finding it, this included experienced instructors and vehicle crews, many of whom resorted to using their own judgement or a locally produced document rather than referring to the authoritative

[15] JSP 375 Volume 1. Chapter 40, page 2, paragraph 6.
[16] MOD SharePoint, Portfolio Management Reporting System – User Guidance. Defence lines of development (DLODs). Viewed 30 January 2023.

document. This complex, confusing, contradictory and difficult to find information led to key knowledge gaps and safe practices either not being fully understood or not adhered to. This also led to individuals being employed in roles for which they were not qualified. Several recommendations have been made to rectify the identified issues. The common themes were to simplify, reduce repetition, update and clarify in order to ensure information is coherent, readily available and crucially, used.

Access to information

1.4.14. The information requirements for those conducting and supporting Exercise COMBAT SPIRIT (Ex CS) fell into five main categories: equipment support, Warrior operating information, exercise management, training and tactics. Finding the most up to date information was critical to ensure adherence to the latest policy and safe conduct of training.

1.4.15. The panel found significant knowledge gaps amongst Warrior operators and instructors. Notably, the lack of knowledge pertaining to the FV511 command variant and its use, FV511 rear door alarm (a two-tone warning alarm that sounded if the rear doors were open and a forward or reverse gear was selected) and the FV510 embussing and debussing procedures.[17] In the panel's opinion, some knowledge gaps were partly due to individuals not understanding which publication contained the authoritative information. This was highlighted by a senior instructor who had difficulty finding information pertaining to the armoured infantry tactics and Warrior procedures that they instructed on. The panel attributed this issue to three main reasons:

Witness 6
Witness 14
Witness 32

a. **Scope**. The panel found numerous sources of information, which when viewed collectively held most of the information required to fulfil a function safely. However, this information was not consolidated into a single source, and was often in differing formats. For example, soldiers in the infantry were familiar with army training publications that pertained to weapon training and dismounted close combat tactics, and in the panel's opinion they were less familiar with AESPs[18] which were viewed as vehicle maintenance documents. This led to individuals using their perceived knowledge to conduct a task such as equipment checks and debussing procedures, rather than referring to the correct source information for the most up-to-date endorsed procedure.

b. **Knowledge**. A number of those interviewed did not have a working knowledge of some of the key publications relevant to their role. Many relied on the information that had been taught during their qualification courses, rather than referring to the relevant and valid publication. This was the case for the Warrior debussing procedure as highlighted by some of the Warrior crews and instructors, who

Witness 6
Witness 33
Witness 35
Witness 47

[17] Embussing and debussing are the terms used for the procedures used by passengers to enter and exit a Warrior.
[18] AESPs were a suite of technical documents that provided the information to operate, inspect and maintain equipment.

were not aware the procedure was detailed in the FV510 operating AESP.

c. **Access**. All publications were accessed using the MOD information and communications technology (ICT) system (MODNET). Personnel were discouraged from printing documents as a preventative measure to reduce the risk of referencing out of date information. Whilst in barracks, not all personnel had access to MODNET user access devices such as laptops and desktop computers, with which to view the relevant publications. This was particular true for the junior ranks. The problem was exacerbated when deployed away from their barracks due to a lack of access to deployable ICT.

1.4.16. The panel **observed** that the fragmented and difficult-to-access information contributed to significant knowledge gaps amongst Warrior crews and instructors.

Army Equipment Support Publications (AESPs)

1.4.17. AESPs were a suite of technical documents that provided the information to operate, inspect and maintain equipment. All AESPs had reference numbers which identified their purpose. The key Warrior AESPs referred to or examined during this inquiry were:

a. **Combat Vehicle, Tracked, Warrior Bowman, common items**

(1) AESP 2350-T-200-601 – Maintenance Schedule.

(2) AESP 2350-T-200-811 – Modification Instructions and Index.

b. **Combat Vehicle, Personnel, Tracked, 30mm Gun, Warrior Bowman (FV510)**

(1) AESP 2350-T-201-101 – Purpose and Planning Information.

(2) AESP 2350-T-201-201 – Operating Information.

(3) AESP 2350-T-201-302 – Technical Description.

(4) AESP 2350-T-201-532 – Inspection Standards Part 1.

c. **Combat Vehicle, Infantry Command, Tracked, 30mm Gun, Warrior Bowman (FV511)**

(1) AESP 2350-T-202-101 – Purpose and Planning Information.

(2) AESP 2350-T-202-201 – Operating Information.

(3) AESP 2350-T-202-302 – Technical Description.

(4) AESP 2350-T-202-532 – Inspection Standards Part 1.

(5) AESP 2350-T-202-711 – Illustrated Parts Catalogue.

1.4.18. The panel identified a number of issues with the AESPs.

a. **User knowledge**. The panel found that the Royal Electrical and Mechanical Engineer (REME) vehicle mechanics and vehicle inspectors had a good working knowledge of the AESPs, for the purpose for which they used them (maintenance, repair and inspection). Warrior crews (commanders, drivers, gunners and dismounts),[19] were less familiar and knowledgeable with the AESPs and their application. In the panel's opinion this was due to the complexity of the AESPs and the user's difficulty in accessing them. This created two issues:

(1) **Maintenance**. A number of crews interviewed preferred to use locally produced information sheets or their own notes, rather than refer to the maintenance schedule (AESP 2350-T-200-601) when conducting vehicle 'before', 'during' and 'after use' checks, and commander's function tests (CFT). The crews indicated this was largely due to accessibility issues to the AESP when in barracks and when deployed. This ran the risk of checks not being conducted in accordance with the most up to date endorsed procedures.

Witness 32

(2) **Operating instructions**. A number of Warrior crews indicated they relied on the information that had been taught during the qualification courses, rather than referring to the correct publication. This led to knowledge gaps amongst crews and some misconceptions that went unchallenged. For example, a number of Warrior crews did not know that FV511s had a rear door alarm. This included an experienced Warrior sergeant, a student commander and the driver of the FV511 involved in the accident.

Witness 14
Witness 32
Witness 41

b. **Debussing**. The debussing procedure was contained in the FV510 operating information AESP (2350-T-201-201),[20] and it only pertained to debussing from an FV510 and not the FV511 (the Warrior variant involved in the accident). Despite other variants of Warrior having a troop-carrying capability that required personnel to debus from the vehicle through the rear doors, there were no instructions detailing the procedures for those variants. This included the FV511 which had notable differences to the FV510, such as

Exhibit 39
Exhibit 58
Exhibit 59

[19] Dismounts refer to those personnel who travel in AVs but conduct their role primarily when 'dismounted' from the vehicle.
[20] This procedure was repeated in the Warrior Driving and Maintenance Course folder.

manual doors and no 'door clear' switch for debussing troops to inform the crew that they had exited the vehicle. This lack of a recognised procedure in the FV511 operating AESP (2350-T-202-201), resulted in Student Commander 1 without a 'safe practice' with which to safely debus personnel from the FV511 which they were commanding.

1.4.19. The panel concluded that the absence of a debussing procedure in the AESP 2350-T-202-201 (FV 511 operating information), left those who were required to exit an FV511 through the rear doors without a recognised safe practice with which to do so. The panel finds the absence of an FV511 debussing procedure was a **contributory factor**.

1.4.20. The panel concluded that due to the accessibility, format and layout of AESPs, Warrior crews found it difficult to acquire key operating and maintenance information. This resulted in a knowledge gap amongst a large proportion of Warrior crews which reduced their proficiency in operating Warrior safely. The panel finds the accessibility, format and layout of AESPs, was **an other factor**.

1.4.21. **Recommendation. Deputy Chief of Staff Field Army should ensure that formal debussing procedures are devised and incorporated into the operating instructions for those in-service passenger carrying armoured vehicles (AV) that the Field Army are responsible for, to ensure there is safe system of work in place for troops to debus safely from AV.**

1.4.22. **Recommendation. Deputy Assistant Chief of Staff Littoral Strike should ensure that formal debussing procedures are devised and incorporated into the operating instructions for those in-service passenger carrying armoured vehicles (AV) that the Navy are responsible for, to ensure there is safe system of work in place for troops to debus safely from AV.**

1.4.23. **Recommendation. Deputy Commander Strategic Command should ensure that formal debussing procedures are devised and incorporated into the operating instructions for those in-service passenger carrying armoured vehicles (AV) that Strategic Command are responsible for, to ensure there is safe system of work in place for troops to debus safely from AV.**

1.4.24. **Recommendation. Deputy Chief of the General Staff should reformat operating and maintenance instructions for armoured vehicles (AVs) and improve accessibility to the information. This is to ensure AV crews have the correct knowledge to enable them to safely operate and maintain the AVs for which they are responsible for.**

Pamphlet No 21 Training Regulations for Armoured Fighting Vehicles, Infantry Weapon Systems and Pyrotechnics (Pam 21)

1.4.25. Ex CS was a blank firing exercise involving armoured fighting vehicles (AFVs), infantry weapon systems and pyrotechnics. The regulations that govern the planning, conduct and supervision of such exercises were contained in Pam 21. Pam 21 stated that the application of the regulations was mandatory and approved best practice, enabling realistic and demanding training whilst ensuring that risks were reduced to ALARP. Pam 21 was structured to follow the progression of training associated with AFVs and infantry weapon systems. It explained the SSW and rules for awarding qualifications to plan, conduct, and supervise all live and blank firing with AFVs and infantry weapon systems. The chapters relevant to simulated training[21] and AFVs were: Exhibit 43

a. **Chapter 1**. This chapter explained the SSW and the qualification and authorisation process for all forms of live and blank firing training with AFVs and infantry weapon systems.

b. **Chapter 2**. This chapter prescribed the responsibilities of key personnel in the SSW and explained the planning process that was relevant to all forms of training with AFVs, infantry weapon systems and pyrotechnics.

c. **Chapter 3**. This chapter contained the regulations for training using various forms of training simulation with infantry weapon systems, including additional planning considerations specific to blank ammunition and pyrotechnics.

d. **Chapter 5**. This chapter detailed the planning considerations, safety rules and procedures for firing AFV weapon systems on ranges and during fire and manoeuvre exercises.

e. **Chapter 8**. This chapter detailed the planning considerations, safety rules and procedures for combined arms exercises and training for high readiness.

1.4.26. The information contained in these chapters all related to blank or live firing aspects of training. None of the regulations referred to the safe planning, conduct or supervision of the non-firing aspects of AFV training (such as mobility training).

1.4.27. The absence of regulations and guidance for the planning, conduct and supervision of exercises involving the non-firing aspects of AFV training, resulted in key safety aspects, such as recognised methods to supervise student AFV commanders during tactical exercises, not being articulated in Ex CS's Exercise Action Safety Plan (EASP).

[21] Simulated training in this context refers to real people operating real equipment in a real environment with simulated effects (such as blank ammunition and pyrotechnics to simulate live ammunition).

1.4.28. The panel concluded that Pam 21 did not contain information for the planning, conduct and supervision of the non-firing aspects of AFV training, and that there was an absence of policy pertaining to these aspects which left the exercise staff without a recognised safe practice with which to conduct Ex CS safely. The panel finds the absence of policy regarding the non-firing aspects of AFV training was **an other factor**.

1.4.29. **Recommendation. Director Land Warfare should ensure policy and guidance is put in place for the safe planning, conduct and supervision of training involving the non-firing aspects of armoured fighting vehicle (AFV) training to ensure there is a safe system of work in place for AFV tactical training.**

Armoured Vehicle Standing Orders (AVSOs)

1.4.30. AVSOs provided military direction to commanders and troops to be applied in their operations and training. AVSOs stated this was based on the most up-to-date experience and best practice available. The orders covered all AVs, whether tracked or wheeled. They stated that all personnel were to operate the equipment as laid down therein, and within the relevant AESP and any local standing orders, and that it was a chain of command responsibility to ensure that only competent personnel carried out tasks on AVs. Exhibit 20

1.4.31. **AV role definitions**. AVSOs listed the definitions of AV crews and other AV personnel. The panel found that some of the direction contained in AVSOs was ambiguous and lacked sufficient detail to enable safe training.

a. **AV commander - student**. AVSOs did not distinguish between 'fully competent' AV commanders[22] and student AV commanders. This meant student commanders were entirely responsible 'for the operation of the vehicle, the safety of its crew (including associated dismounts), its equipment and all other passengers including their equipment and others nearby who may be affected by the operation of the AV'.[23] In the panel's opinion, had AVSOs distinguished between a student AV commander and a fully qualified and competent commander, it is highly likely that the exercise staff would have been compelled by policy to have additional control measures in place to ensure training was being conducted in a manner that provided a SST. This may have included supervision - at the time of the accident the Warrior student commanders were not directly supervised. Exhibit 20

[22] AVSOs. Page 1-3, paragraph 1-05.b. An AV commander was deemed to be fully competent when tactically trained by the appropriate ARMCEN delivered AFV tactics course.
[23] AVSOs. Page 1-4, paragraph 1-07. AV commander responsibilities.

b. **Other AV crew**. Other personnel who could either operate from, or travel in AVs, were referred to in several places in AVSOs. Different terminology was used to describe them: Exhibit 20

(1) **Chapter 1**. 'Other AV crew' were defined in chapter 1 as: 'all personnel, military or civilian, whose role requires them to operate from the AV and who are not qualified in the above roles [AV crew] e.g. Platform Dismounts' (paragraph 1-21).

(2) **Chapter 6, annex A**. Annex A to chapter 6 referred to 'non-crewman' (paragraph 18.b). It did not distinguish if they differed from 'other AV crew'.

(3) **Chapter 6, annex A**. Annex A to chapter 6 also referred to 'Non-AV trained personnel who travel in or work from an AV' (paragraph 5.b).

(4) **Chapter 6, annex A, appendix 1 and 2**. Appendix 1 and 2 to annex A of AVSOs contains a matrix of continuation training 'competences' for AV crew and dismounts. The term 'dismounts' appears to be used synonymously with 'other AV crew' and 'non-crewman'.

1.4.32. **AV training**. Chapter 6 in AVSOs outlined the AV training construct. It stated individual training was designed to develop the competencies (a mix of knowledge, skills and attitudes) of individual personnel, and takes place in both training establishments and the workplace and consisted of 13 different types of training. The training of each role conducted appeared to differ depending on the definition. The panel found the guidance confusing and formed the opinion it lacked certainty as to who should conduct what training. As highlighted in the following paragraphs: Exhibit 20

a. **Chapter 1**. Other crew (which included platform dismounts) were only required to receive an 'appropriate safety brief' from a competent person (page 1-12, paragraph 1-22.a.).

b. **Chapter 6**. In the training matrices in appendices 1 and 2 to annex A, 'dismounts' were required to undergo practical and theory training during an annual assessment.

1.4.33. **Dismounts' training**

a. **Core individual training**. AVSOs outlined the scope of AV continuation and return-to-role training for all AV crew including dismounts in annex A. This applied to those who were already trained to operate from AVs, not those who were not trained. The panel found no reference to the core training that personnel were required to undertake to qualify them to operate as a dismount from AVs. Exhibit 20

b. **Continuation and return-to-role training**. The continuation and return-to-role training listed in appendix 1 to annex A to AVSOs listed several 'competencies', including embussing and debussing. They were not underpinned by a formal training statement (FTS), training objectives (TOs), enabling objectives (EOs), key learning points (KLPs), training categories or assessment standards. As a result, any training delivered to those employed as dismount troops was not underpinned by the defence systems approach to training (DSAT) and could not be classed as formal training.[24] Exhibit 20

c. **Training delivery**. The lack of an FTS resulted in driving and maintenance instructors (DMIs) teaching dismounts utilising lesson specifications (LSpecs) from other courses. This was ungoverned and lacked a reliable method of recording the training (AVSOs only provided a template for local records). This was evident with the dismounts from 5 RIFLES who supported Ex CS. They had undergone varied training to operate from Warrior. The training was not evidenced with validated training records and the panel was unable to determine if those operating as dismounts during Ex CS were competent to do so and whether they could be classed as 'safe people'. Witness 14

1.4.34. The panel concluded that the lack of student commander distinction in AVSOs led to a deficit of policy regarding safety measures and supervision requirements for student AV commanders. This led to insufficient control measures being put in place during Ex CS for the levels of risk presented by inexperienced student commanders, and was a **contributory factor**.

1.4.35. The panel concluded that AVSOs lacked clarity on the definition and training of those who either operate from, or travel in AVs, including the dismount soldiers in armoured infantry platoons. The lack of formal training and an award of a competence provided no assurance that those who operated from Warrior as a dismount during Ex CS were competent or safe to do so. The panel finds that the lack of clarity in AVSOs on the definition and training of those who either operate from, or travel in AVs was **an other factor**.

1.4.36. **Recommendation. Director Land Warfare should clarify Armoured Vehicle Standing Orders to ensure the status of student armoured vehicle commanders, their responsibilities, and the supervision requirements for them are clear.**

1.4.37. **Recommendation. Director Land Warfare should ensure that formal training and an award of a competency is devised and**

[24] JSP 822 (V4.1 Nov 21) Pt 1, Sect 10 – Glossary. Page 246. Formal training. Training activity, no matter where or how it is delivered, derived from the application of the defence systems approach to training (DSAT) process and articulated in a Formal Training Statement (FTS).

implemented for all personnel who are required to operate from armoured vehicles as passengers to ensure they are competent and safe to do so.

Mounted Close Combat (MCC) Training - Volume 1 Individual Training. All Arms Fieldcraft and AV Battle Drills

1.4.38. The aim of the MCC Training – Volume 1 Individual Training pamphlet titled 'All Arms Fieldcraft and AV Battle Drills', was to provide soldiers with a comprehensive and easily understood set of guidelines giving practical advice on basic mounted fieldcraft. It gave details for the use of wheeled or tracked AV engaged in combat tasks. It was aimed at individuals who operated as a member of an AV crew. The pamphlet had nine chapters: Exhibit 54

a. Chapter 1 — Battle preparation and battlefield discipline.

b. Chapter 2 — Living in the field: hides, harbours and leaguers.

c. Chapter 3 — AV protection and concealment.

d. Chapter 4 — Movement in open terrain.

e. Chapter 5 — Movement in urban and close terrain.

f. Chapter 6 — Mounted contact drills.

g. Chapter 7 — Working with dismounts.

h. Chapter 8 — Mounted combat service and support (CSS).

i. Chapter 9 — AV battle drills.

1.4.39. The pamphlet was accessed through the British Army electronic Battle Box (BAeBB).[25] Its format was similar to other training publications, and its familiar layout made the pamphlet easy to reference.

1.4.40. Chapter 1 contained crew responsibilities. Whilst they were similar to the responsibilities laid out in AVSOs, there were many differences. For example AVSOs listed 32 responsibilities of an AV commander,[26] the MCC fieldcraft pamphlet only listed seven.[27] Having responsibilities listed in two separate publications, and them being different, was as likely as not to cause confusion as to which were the correct and definitive set of responsibilities. Exhibit 20 Exhibit 54

1.4.41. Chapter 7 referred to a 'dismount drill', then describes a 'debussing' drill.[28] Warrior AESPs were clear that dismounting referred to the crew Exhibit 54

[25] British Army electronic Battle Box (BAeBB). The Battle Box was an electronic repository that contained published doctrine produced by Warfare Branch, HQ Land Warfare Centre.
[26] AVSOs. Page 1-4, paragraph 1-07. AV commander responsibilities.
[27] Mounted Close Combat (MCC) Training - Volume 1 Individual Training. All Arms Fieldcraft and AV Battle Drills. Page 1-2, paragraph 0101.
[28] Mounted Close Combat (MCC) Training - Volume 1 Individual Training. All Arms Fieldcraft and AV Battle Drills. Chapter 7, section 2.

getting off the vehicle and debussing referred to troops exiting the rear of an FV510. The lack of consistency in terminology was likely to create confusion.

1.4.42. The panel concluded that there were inconsistencies between the information in the All Arms Fieldcraft and AV Battle Drills pamphlet and that contained in AVSOs and the AESPs. This highlighted a lack of coherence in AV doctrine and operating procedures. This had the potential for critical information being overlooked or obscured, leading to AV crews not fully understanding their responsibilities and AV operating procedures. The panel finds that the lack of coherence in AV doctrine and operating procedures was **an other factor**.

1.4.43. **Recommendation. Director Land Warfare should review armoured vehicle (AV) doctrine and operating instructions for in-service Army platforms, and remove / correct any inconsistencies identified, to ensure that there is coherent direction and guidance on responsibilities and operating procedures for AV crews.**

Concept of Use (CONUSE) – Warrior Infantry Fighting Vehicle

1.4.44. During the acquisition process of military equipment, a concept of employment (CONEMP) was written to describe how a new capability would be employed. It was primarily written to allow the requirements for that capability to be refined and developed. Before a capability entered service, CONEMPs were translated into CONUSE documents which reflected how the chosen solution (such as Warrior) was to be used. A CONUSE described the way in which a specified capability was to be employed in a range of activities, operations or scenarios, and could be updated to reflect the intended use when changes occurred. It was a fundamental part of the equipment's safety case and provided the context for the risks associated with the equipment to be assessed to determine if they were ALARP and tolerable.

1.4.45. The detail from the CONUSE that was required by those who used and employed the equipment was usually reflected in the doctrine and the operating instructions associated with it. They would not ordinarily refer to the CONUSE.

1.4.46. The latest version of the Warrior CONUSE was dated 2 March 2015. Although it had not been updated since then, the panel assessed the information was relevant and accurately reflected Warrior's use and employment. Exhibit 3

1.4.47. Some of the detail from the CONUSE was not reflected in other publications (see Doctrine Note 19/02 - Warfighting Tactics Part 5A: Armoured and Armoured Infantry Sub-unit Tactics). In particular, the absence of explicit detail of the intended use for the FV511 left users without explicit parameters for the use of the FV511. Therefore, if used in a way not Exhibit 29

intended in the CONUSE, the associated risks of using it in that manner would not have been assessed and would unlikely be ALARP and tolerable.

1.4.48. The panel concluded that those who used and employed Warrior were not provided with sufficient detail from the CONUSE in the publications and doctrine associated with the vehicle. This left them without the correct knowledge in which to operate or employ Warrior safely. The panel finds that the lack of information from the CONUSE in the publications and doctrine associated with the vehicle was **an other factor**.

1.4.49. **Recommendation. Director Land Warfare should ensure that all doctrine relating to Warrior is amended to ensure the intended use of all Warrior variants, as outlined in the Warrior CONUSE, is clear. This is in order to improve the knowledge of those who employ and operate Warrior to ensure its use is in line with the safety case.**

Doctrine Note 19/02 - Warfighting Tactics Part 5A: Armoured and Armoured Infantry Sub-unit Tactics

1.4.50. Doctrine Note 19/02 covered a wide range of tactical activities for armoured and armoured infantry sub-units within a battlegroup structure during warfighting at scale.[29] It was designed to be used by all armoured infantry brigade units, as well as forming the foundation for tactical training at the Armour Centre (ARMCEN).[30] This included the RATD instructors. Exhibit 29

1.4.51. The doctrine note had five chapters. Chapter 1 described the roles, organisation and capabilities of sub-units when warfighting at scale. It described the roles of key sub-unit posts and the capabilities found within a typical squadron / company group (see section 2 for a description of the company organisation laydown). Exhibit 29

1.4.52. The panel acknowledged that the description of roles, organisations and capabilities gave a good overview, but in areas lacked some detail. Notably the diagrams of an armoured infantry company[31] showed the distribution of Warrior platforms, but did not define the variant (see figure 1.4.2). This was a further example of doctrine and information publications not conveying the information set out in the Warrior's Concept of Use (CONUSE) document that would have helped to ensure those who operate and command Warrior understood the purpose and role of each variant. Some of the students on the AIPCC were unaware that the FV511 was not a platoon commander's vehicle (its use as a platoon commander's vehicle on Ex CS had given them a false lesson). Had the variants been included in the diagrams (see an example in figure 1.4.3), it would have reinforced the correct role of the FV511 and reduced the chance of it being used outside of its safe operating envelope. Exhibit 3

[29] No definition of 'warfighting at scale' could be found. The panel's understanding of the term related to divisional level operations.
[30] ARMCEN has subsequently been subsumed into the Combat Manoeuvre Centre (CMC).
[31] Doctrine Note 19/02 - Warfighting Tactics Part 5A: Armoured and Armoured Infantry Sub-unit Tactics. Page 1-3, figure 1-1.

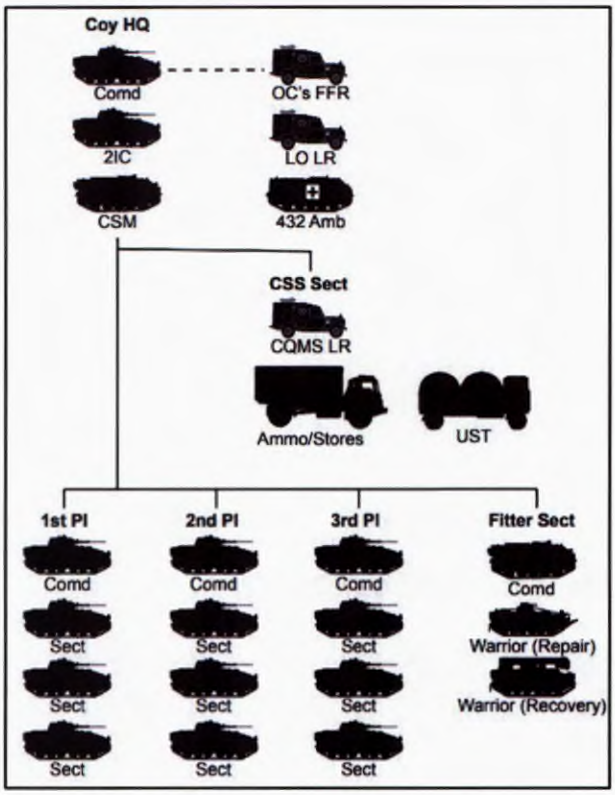

Figure 1.4.2 – Diagram of an armoured infantry company taken from Doctrine Note 2/19

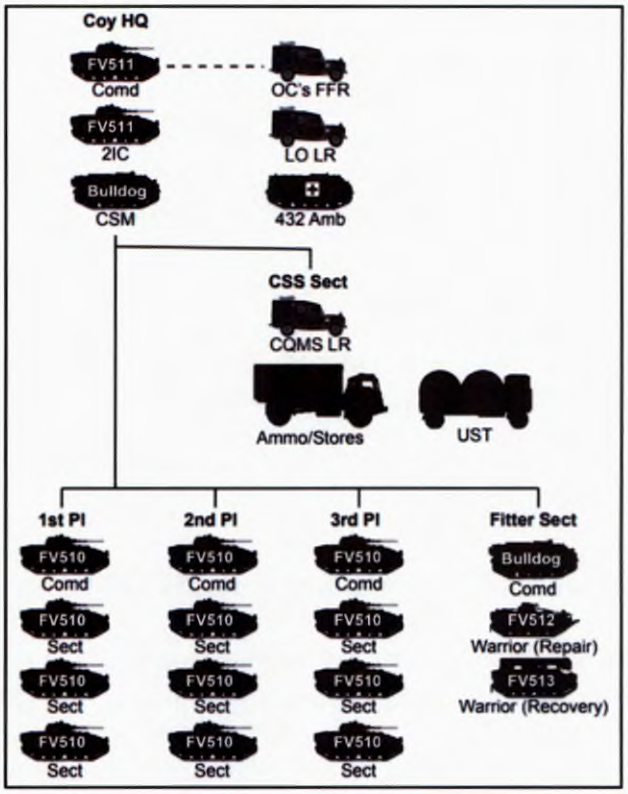

Figure 1.4.3 – Diagram of an armoured infantry company with Warrior variants annotated

1.4.53. The panel **observed** that Doctrine Note 19/02 - Warfighting Tactics Part 5A: Armoured and Armoured Infantry Sub-unit Tactics, lacked detail that would have reinforced the intended use of an FV511 as shown in the Warrior CONUSE.

Turret Weapons and Equipment – 30 mm Gun Warrior pamphlet

1.4.54. The Turret Weapons and Equipment – 30 mm Gun Warrior pamphlet was accessed through the BAeBB. The aim of the pamphlet was to provide a comprehensive and easily understood set of guidelines giving instructors and students the knowledge required to operate the Warrior's weapon systems. Exhibit 57

1.4.55. The focus of the pamphlet was predominantly aimed at the operation of the Warrior's weapon systems. The initial lessons covered vehicle descriptions and safety procedures. The content appeared to have been taken directly from the AESPs, but was presented in what was considered an easy to understand format and was easy to find from the contents section. It contained information on the FV510, FV512, FV513, FV514 and FV515 variants. However, it did not cover the FV511 specifically.

1.4.56. The panel **observed** that the absence of the FV511 from the Turret Weapons and Equipment – 30 mm Gun Warrior pamphlet could have misled users and instructors to believe that the FV511 was synonymous with the FV510. Whilst there were similarities, the differences that existed between the two platforms were not highlighted and this increased the risk of the FV511 being operated outside of its safe operating envelope.

1.4.57. The panel **observed** that the Turret Weapons and Equipment – 30 mm Gun Warrior pamphlet was formatted and accessed in a way that most soldiers were accustomed to. In the panel's opinion this made it easier to find and understand the operating instructions than in the Warrior AESPs. The panel opined that the preferred format for presenting all Warrior operating instructions was as presented in the Turret Weapons and Equipment – 30 mm Gun Warrior pamphlet.

Salisbury Plain Training Area (SPTA) Range Standing Orders (RSOs)

1.4.58. Part 1 of SPTA RSOs governed general points and 'dry' training[32] on the area. The orders were supported by the SPTA Military Training Facility Generic Risk Assessments. The RSOs and the generic risk assessments (RAs) were reviewed annually by the Range Administering Unit. Both had been reviewed in April 2022 and revised versions had been published, and were valid, at the time of the accident. Exhibit 12 Exhibit 114

1.4.59. The RSOs contained organisational information, a description of the facilities, training safety information, administration instructions, planning instructions and instructions on exercise conduct. To ensure SPTA was a safe place for training, all exercise planners and commanders were to read and comply with the orders.

1.4.60. There were 25 separate RAs identified in the generic RA document. The first two RAs pertained to driving, where an emphasis was placed on the rate of vehicle accidents as a major hazard during training on the area. The associated control measures focused on speed limits. Hazards involving AVs were identified in: Exhibit 114

a. RA 1 – Driving on SPTA. RA 1 identified that trainees in AVs may be injured by cord, wire or string while driving on the training area.

b. RA 7 – SPTA (Centre) Range Danger Area. RA 7 identified that trainees, controlled personnel and the general public could be at risk from being hurt by fast moving, unlit tracked vehicles.

[32] The panel could not find an official definition of 'dry' training. The term is often associated with training that does not involve the use of ammunition, but it is often used to describe training involving blank ammunition and pyrotechnics. Its use in SPTA RSOs referred to the training areas where non-live firing training occurs, this included areas where blank firing was permitted.

c. RA 9 – SPTA (West) Range Danger Area. RA 9 identified that there was a risk from manoeuvring armoured vehicles by both day and night and during non-firing periods.

d. RA 18 – Other controlled hazards. RA 18 identified risks from pyrotechnics, battle noise simulation, AVs, convoys and general military activity.

1.4.61. The panel noted that two of these (RAs 7 and 9) related specifically to the live firing areas, although the hazards equally applied to the 'dry' training areas.

1.4.62. RSOs stated: 'SPTA is the largest and busiest training area in the UK, and the only one that enables large scale armoured manoeuvre'.[33] Given its use and scale of exercises permitted, the risk of accidents involving AVs and dismounted personnel would have been highly probable, and yet the panel assessed there seemed to be few hazards in the generic RA relating to those risks. Exhibit 12

1.4.63. The panel concluded that the instructions in SPTA RSOs were thorough, appropriate and freely available to units operating on SPTA, and were **not a factor**.

1.4.64. The panel **observed** that due to the nature and scale of exercises undertaken on SPTA, there was an increased risk of accidents involving AV and dismounted personnel which was not reflected in the SPTA Military Training Facility Generic Risk Assessments.

Aide Memoire for Troops on SPTA (Version 21.1)

1.4.65. The Aide Memoire for Troops on SPTA consisted of a two-page document that contained instructions on emergency procedures and vehicle use on SPTA. There was a requirement for all exercise participants on SPTA to carry a copy of the aide memoire and for them to have been briefed on its content. Exhibit 121

1.4.66. The emergency services flow diagram shown on the aide memoire was also contained in SPTA RSOs (page 1-3-B-2). The flow diagrams that were valid at the time of the accident, instructed exercising troops to call the emergency services direct for serious incidents. This has since changed, and the revised direction states that the emergency services should be summoned through Range Control's operations room. Exhibit 12

1.4.67. The procedure that was valid at the time of the accident allowed for those at the scene of the accident to talk direct to the emergency services which aided their assessment of the casualty (see section 6). Whilst the revised procedure allows Range Control to direct other users on the training

[33] Salisbury Plain Training Area (SPTA) Range Standing Orders (RSO). Page i.

area to stop firing on some or all ranges to allow for safe passage of the emergency services to the scene of an accident / incident, it does not allow the emergency services to remotely assess a casualty using live footage sent over a mobile phone by those at the scene of the accident.

1.4.68. The panel **observed** that allowing those at the scene of an accident on SPTA to call the emergency services direct, offered the benefit of enabling the emergency services to remotely assess a casualty's condition, potentially through live footage sent over a mobile phone if available.

'It's Plain Sense' video

1.4.69. SPTA RSOs stated it was mandatory for all ranks exercising on SPTA to watch the video entitled 'It's Plain Sense' which covered the main 'dos' and 'don'ts' of SPTA. It was published in 2009 and consisted of several parts.

Exhibit 12
Exhibit 115

1.4.70. The video was dated, but the safety points highlighted in the video were still valid, such as the driving hazards on SPTA. A number of the references shown in the video, such as the 2009 aide memoire, were obsolete and had potential to give the viewer incorrect information. This combined with the dated footage, such as soldiers in out-of-date uniforms, could also detract from the importance of the content.

Exhibit 115

1.4.71. The panel **observed** that the video entitled 'It's Plain Sense' was dated but still relevant. However, some of the outdated information and footage could detract from the messages the video was attempting to portray to users of SPTA.

Section 2 - Organisation

General

1.4.72. Responsibility for a number of aspects that directly or indirectly affected the activity which led to the accident, lay outside of the unit that was responsible for the planning, conduct and supervision of that activity (Ex CS). This section examines the relevant organisational aspects including: organisational structures, resourcing, roles, preparedness, organisational competence, and scheduling.

1.4.73. The inquiry focused on the organisations as they were structured at the time of the accident, some have subsequently undergone an organisational change.

Organisation - executive summary

1.4.74. The inquiry identified several talented and dedicated individuals who were relentless in the pursuit of excellence in challenging conditions. In the panel's opinion, those challenges stemmed from an organisation (the Army) which was overcommitted, under-resourced and unable to master their core business due to competing requirements. It was also the panel's opinion that this was not an unusual situation and brought with it significant risk. That risk manifested itself during Exercise COMBAT SPIRIT (Ex CS), where a 'can-do' attitude prevailed. This led to a sub-unit being tasked to support an exercise involving student armoured vehicle commanders, despite being under-resourced and lacking sufficient organisational competence to support the exercise safely. Whilst not a contributing factor, such shortfalls increase the risk of similar accidents in the future.

Army Headquarters (HQ)

1.4.75. The Army HQ was the executive element of the Army comprising seven directorates and other strategic entities. Its purpose was to 'set the strategic direction and drive the changes required to enable the Army to deliver'.[34] It was based at Andover and was commanded by the Chief of the General Staff (CGS), a 4-star general. One of the organisations subordinate to it was the Field Army (see figure 1.4.4).[35]

Exhibit 141
Exhibit 152

[34] 20210316 – Army Operating Model (AOM)-Core Narrative-O.pptx. Slide 11. Viewed 14 February 2023.
[35] ADR010310-Future Soldier Guide. Published 25 November 2021. Page 27.

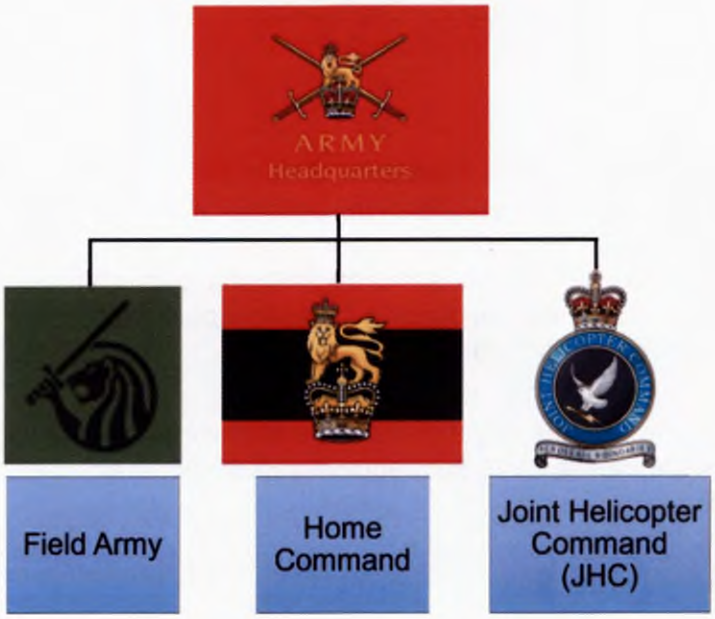

Figure 1.4.4 – Army organisational chart

Head of Capability (HoC) Ground Manoeuvre (GM)

1.4.76. HoC GM was the capability sponsor for Warrior and a co-signatory to the Warrior safety case. HoC GM was a one-star (brigadier) led organisation which formed part of the Army Capability Directorate, a 2-star (major general) led directorate in Army HQ. As part of a change to the Army Operating Model, HoC GM was replaced by Military Capability Plans Ground Manoeuvre (MCP GM), which was part of the newly formed Futures Directorate within Army HQ. The Warrior capability responsibilities held by HoC GM should have moved to the Field Army in April 2022. This was delayed, and they were retained by MCP GM.

HQ Field Army

1.4.77. HQ Field Army was the generating and operating command for the Army, with responsibilities across current and contingency operations, and with persistent engagement overseas. It delivered the land component command for programmed operations, and wider activity. In addition, it provided trained land force elements for operations, including wider support to the joint force, standing military commitments and delivery of the Army's specified contribution to contingent operations. HQ Field Army was commanded by Commander Field Army (CFA), a 3-star officer (lieutenant general), based at Andover. It exercised day-to-day control of most formations within the Army including the 3rd (UK) Division (see figure 1.4.5).[36]

Exhibit 152

[36] ADR010310-Future Soldier Guide. Published 25 November 2021. Page 35.

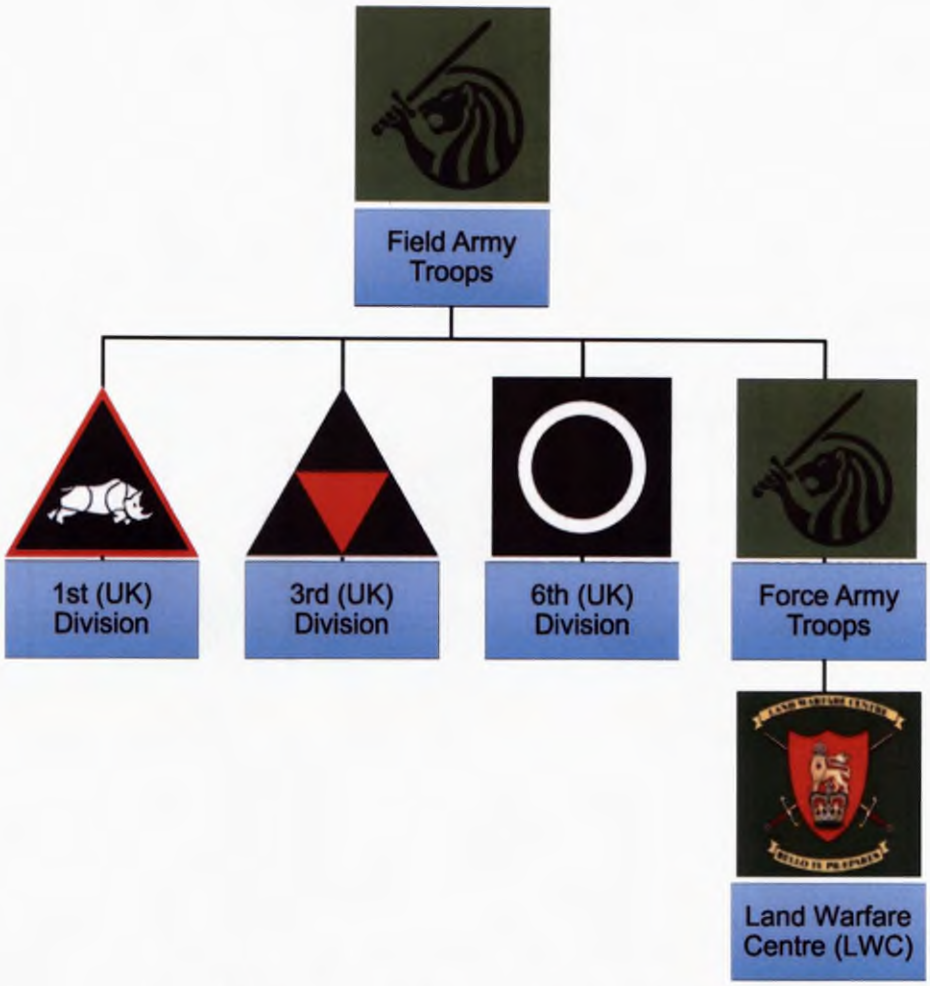

Figure 1.4.5 – Field Army organisational chart

3rd (UK) Division

1.4.78. 3rd (UK) Division was the Field Army's warfighting division. It had a deployable 2-star HQ and it generated and deployed force elements for operations. 3rd (UK) Division was commanded by a 2-star major general, based at Bulford. It exercised day-to-day control over several warfighting and supporting formations, one of which was 20th Armoured Brigade Combat Team (20 ABCT) (see figure 1.4.6).[37]

Exhibit 152

[37] ADR010310-Future Soldier Guide. Published 25 November 2021. Page 53.

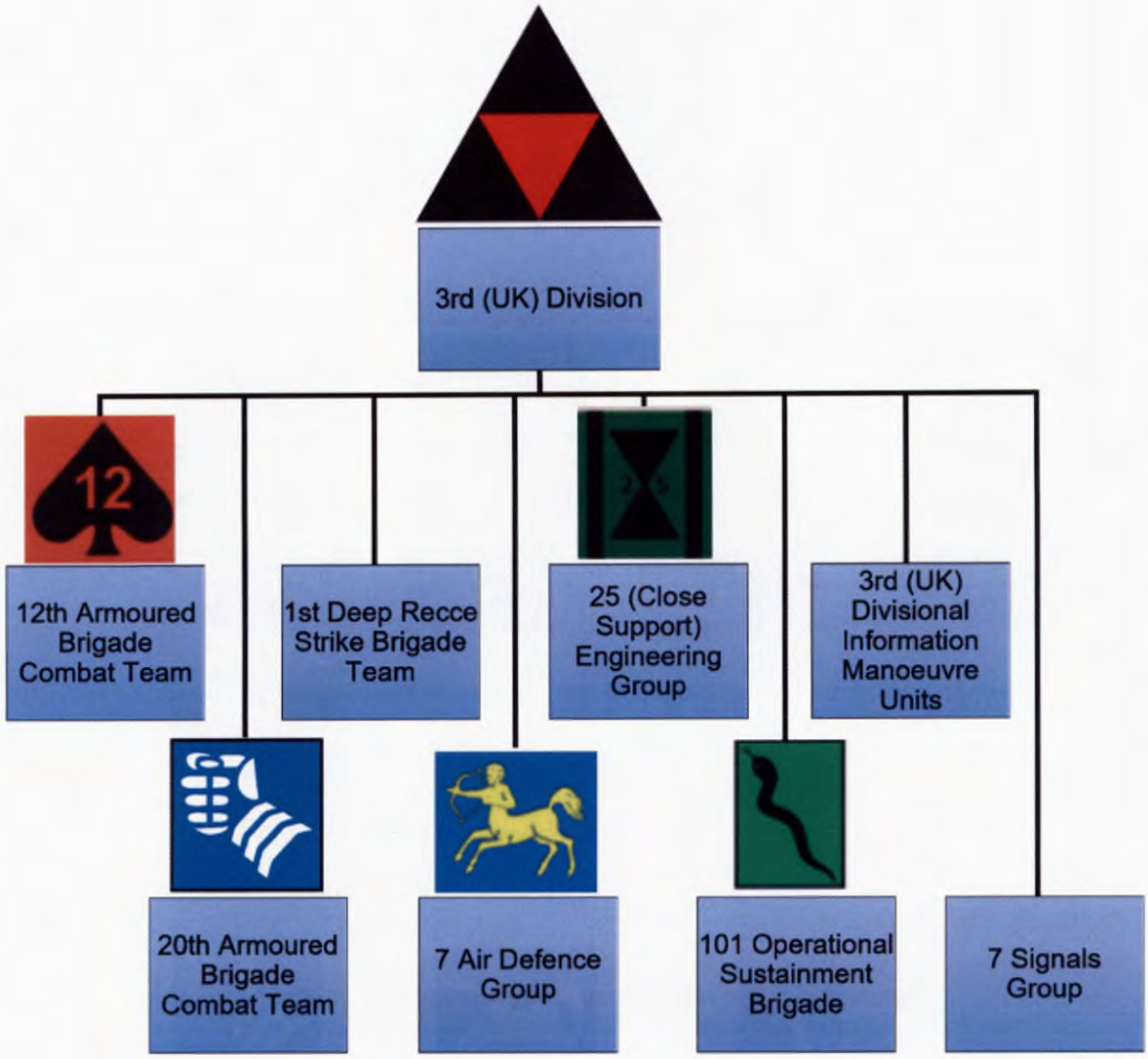

Figure 1.4.6 – 3rd (UK) Division organisational chart

20 ABCT

1.4.79. The 20 ABCT was one of two ABCTs in the 3rd (UK) Division, and was the cornerstone of the warfighting division's close combat capability. It was equipped with the Challenger 2 (CR2) main battle tank and Warrior. The brigade HQ was based at Bulford Camp and most of its subordinate units, which included 5 RIFLES (see figure 1.4.7),[38] were based at Bulford or Tidworth Camps. 20 ABCT was commanded by a brigadier, a 1-star officer.

Exhibit 152

[38] ADR010310-Future Soldier Guide. Published 25 November 2021. Page 57.

Figure 1.4.7 – 20 ABCT organisational chart

5 RIFLES

1.4.80. 5 RIFLES was an armoured infantry battalion under the operational command of 20 ABCT. It consisted of three armoured infantry companies (A, B and D), a fire support company, an HQ company and a battalion HQ (see figure 1.4.8). Its commanding officer (CO) was a lieutenant colonel.

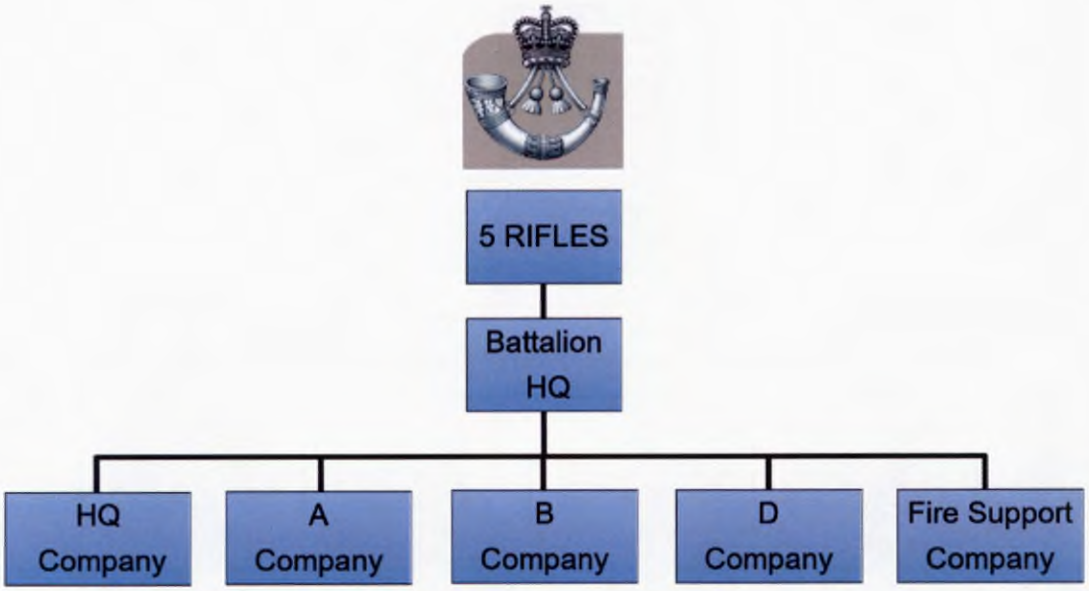

Figure 1.4.8 – 5 RIFLES organisational chart

D Company

1.4.81. D Company provided the Support to Experimentation and Training (SET) troops[39] for Ex CS. At full strength and when deployed, an armoured infantry company consisted of 112 personnel arranged into a company HQ, three platoons, a fitter section and a CSS section (see figure 1.4.9) as described below.

a. **Company HQ**. The company HQ mounted in two FV511 command vehicles, the company commander in one and the company second in command (2IC) in the other. In addition, the company sergeant major was allocated a Bulldog armoured personnel carrier (APC).[40] A Land Rover fitted for radio (FFR) was also allocated to the company commander. A Bulldog ambulance and combat medical technician (CMT) provided integral medical support for the company.

b. **Platoons**. Each platoon consisted of an officer and 30 soldiers mounted in four FV510s. The platoon commander had one FV510 and was supported by a platoon sergeant and a Warrior sergeant. The remainder of the platoon was divided into three FV510 mounted sections, each section commanded by a corporal.

c. **Fitter section**. Armoured infantry companies had an integral repair and recovery capability comprising a REME fitter section led

[39] SET was resourced by the Field Army and provided assistance for a limited duration to support the delivery of essential training, events and trials.
[40] See equipment section for a description of a Bulldog.

by a staff sergeant, with a Bulldog, a Warrior repair vehicle (FV512) and a Warrior recovery vehicle (FV513).

1.4.82. **Combat service support (CSS) section**. The CSS section was responsible for provision of combat supplies to the company. It was mounted in wheeled vehicles.

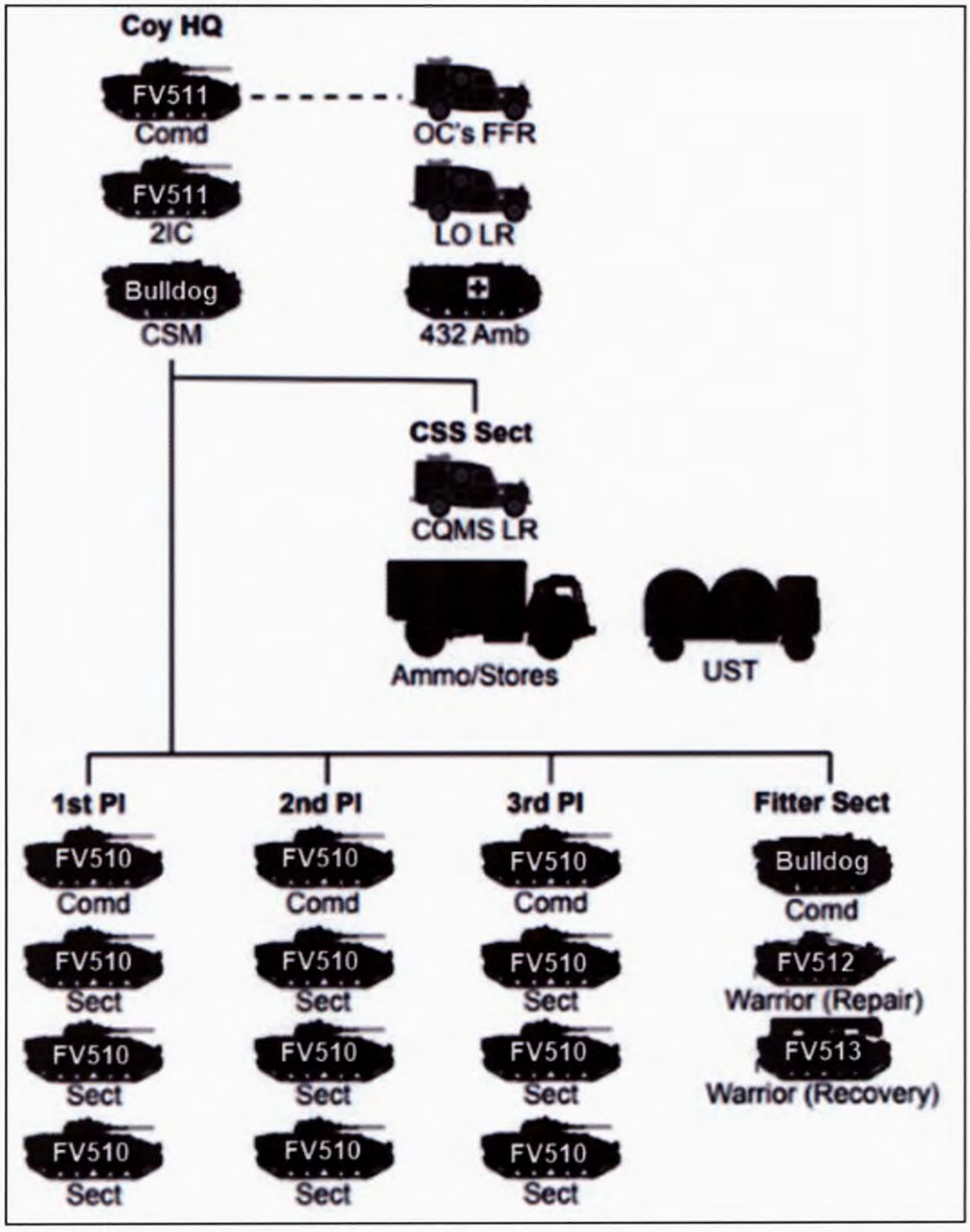

Figure 1.4.9 – Armoured infantry company organisational diagram

1.4.83. During Ex CS, D Company had insufficient resources (equipment and personnel) to field a full armoured infantry company as shown in figure 1.4.9. This included some key command positions that were either not

Witness 11
Witness 13

filled or had others substituting for the roles. The impact of the shortfalls are explored in the practice section.

5 RIFLES - mission and tasks

1.4.84. The 20 ABCT Brigade Order 2022 was issued on 1 April 2022. It provided overarching guidance for 20 ABCT units (including 5 RIFLES), and included their missions, tasks, commitments and a framework on which to operate for the following 12 months. Exhibit 116

1.4.85. The first priority listed in the brigade order was 'Readiness: FE@R [force elements held at readiness] and Individual Preparedness'. 5 RIFLES was directed to be at 40 days readiness, which reduced to 30 days on 1 July 2022.[41] The brigade main effort was listed as 'Individual preparedness and collective readiness (which assumes Combined Arms competence) for operations' (page 8 paragraph 15). A mission common to all units was listed as 'Conduct Unit ITRs [individual training requirements] and BCS [battlecraft syllabus]'.

5 RIFLES - battlecraft syllabus (BCS)

1.4.86. BCS was introduced in 2017. It was designed to meet the annual training requirements needed to achieve and maintain sub-unit or unit competence for all Field Army units.[42] BCS consisted of a 'soldier first syllabus' that focused on basic individual skills that all soldiers required, and collective training, of which there were several levels, which are shown in table 1.4.2. Exhibit 81

Training level (a)	Training output scale (b)	Validated by (c)
ALPHA	Crew / section	Sub-unit commander
BRAVO	Troop / platoon	Sub-unit commander
CHARLIE	Special-to-arm sub-unit	Unit commander
DELTA	Special-to-arm unit	Commander Collective Training Group or brigade commander
ECHO	Combined arms sub-unit	Commander Collective Training Group or battlegroup commander
FOXTROT	Combined arms battlegroup	Commander Collective Training Group or brigade commander
GOLF	Brigade or group	Commander Collective Training Group or divisional commander
HOTEL	Division	Director Land Warfare
INDIA	Corps	NATO

Table 1.4.2 – Battlecraft syllabus training levels

[41] Readiness was the ability of an organisation to undertake a new task. It was described in terms of notice to move (NTM), derived from the time required to generate a force at the requisite state.
[42] Field Army Training Directive 2022. Page 3-6, paragraph 3-20.f.

1.4.87. The Field Army Training Directive 2022 directed that all Field Army units were to complete the relevant BCS to training level CHARLIE (page 6-2, paragraph 6-03). It also stated that recording of performance data and observations were key to allowing the Field Army to assess readiness of the force, identify resource shortfalls and inform training risk (page 6-3 paragraph 6-03). Exhibit 81

1.4.88. D Company was scheduled to conduct BCS to level CHARLIE as preparation and part of Ex PRAIRIE TORNADO, a training exercise in Canada planned for the period 27 July to 27 August 2022. However, this was cancelled due to other commitments. There were no records of D Company achieving BCS level CHARLIE in the preceding 12-months leading up to Ex CS. Subsequently D Company had not achieved BCS level CHARLIE when they deployed on Ex CS. Exhibit 122 Witness 11

1.4.89. As D Company had not conducted BCS to level CHARLIE, they had not met the annual training requirement that would have deemed them to be a competent armoured infantry sub-unit (company). Concerns with the competence of the SET troops was highlighted by some of the exercise staff (see section 6). In the panel's opinion, the lack of organisational and individual armoured infantry competence of those supporting the AIPCC students during the tactics phase compounded the risk already present due to the student Warrior commanders' lack of experience and competence.

1.4.90. The panel concluded that D Company had not achieved BCS (armoured infantry) to level CHARLIE and, therefore, lacked sufficient armoured infantry competence to safely support Ex CS. The panel found this was **an other factor**.

1.4.91. **Recommendation. Chief of Staff Field Army should ensure that force elements participating in Warrior commander qualifying course tactical exercises are qualified, current and competent for the role that they are being employed and with the equipment being used, to ensure there is a safe system of work and that risks are as low as reasonably practicable (ALARP) and tolerable.**

5 RIFLES - training of dismounts

1.4.92. JSP 822 Part 1 defined formal training as: 'Training activity, no matter where or how it is delivered, derived from the application of the Defence Systems Approach to Training (DSAT) process and articulated in a Formal Training Statement (FTS)' (Glossary, page 246). There was no endorsed FTS for those soldiers who operated from Warrior (i.e. the dismounted soldiers who travel in Warrior, not the crew). Exhibit 19

1.4.93. As identified in the analysis of AVSOs, in section 1, there was no formal Warrior training for those soldiers expected to operate from Warrior as a dismount. Exhibit 20

1.4.94. Soldiers joining 5 RIFLES conducted a work induction programme (WIP). This consisted of three sections: diversity and inclusion, health and safety, and security.[43] The Army briefing note that provided guidance on the WIP, stated that units were responsible for delivery of the training and record keeping (records were to be kept for three years). Exhibit 148 Exhibit 150

1.4.95. During the health and safety element of the WIP, soldiers were introduced to the health and safety points of operating in and around AVs in vehicle sheds. The content of this training was not formalised. Both those who undertook the training and those who delivered it, indicated that it covered the topics shown for the AV continuation training (as listed in appendix 1 to annex A of AVSOs). Exhibit 20

1.4.96. For some, this was the only training conducted to operate from a Warrior prior to taking part in Ex CS. Validated training records for the D Company personnel taking part in Ex CS (including 2Lt George) were not produced to the panel. Subsequently there was no evidence that those who operated as dismounts from Warrior during Ex CS had undertaken the WIP training. Therefore, their competency as 'safe persons' could not be established.

1.4.97. The panel concluded that AVSOs lacked clarity on the definition and training of those who either operate from, or travel in, AVs, including the dismount soldiers in armoured infantry platoons. The lack of formal training and award of a competence provided no assurance that those who operated from Warrior as a dismount during Ex CS were competent or safe to do so. The panel finds that the lack of formal dismount training and award of a competency was **an other factor**.

1.4.98. **A recommendation has already been made at paragraph 1.4.37, that the Director Land Warfare should ensure that formal training and an award of a competency is devised and implemented for all personnel who are required to operate from armoured vehicles as passengers to ensure they are competent and safe to do so.**

5 RIFLES – D Company tasks

1.4.99. D Company had not exercised or operated as a full armoured infantry company during the company commander's two-year tenure in command due to the nature of their assigned tasks. It had undertaken some low-level armoured infantry training activity, but most of the tasks had been non-armoured infantry (i.e. not using their AVs). It had supported Witness 11

[43] Army Knowledge eXchange Workplace Induction Programme (WIP) (mil.uk). Viewed 29 March 2023.

a previous iteration of Ex CS, but that exercise was curtailed due to other factors.

1.4.100. The limited time D Company had spent operating with AVs, more likely than not, eroded its overall armoured infantry competence and that of the individuals within the company. The company was about to embark on a training package, culminating in Ex PRAIRIE TORNADO which would have validated their competency as an armoured infantry company. However, D Company was selected to support Ex CS as an armoured infantry company before they could complete the training package and attain an appropriate level (BCS level CHARLIE) for them to do so safely. In the panel's opinion, a 'can do' attitude prevailed, rather than declaring that D Company was not adequately prepared to support Ex CS safely. Exhibit 122

1.4.101. The panel concluded that D Company lacked sufficient armoured infantry competence to safely support Ex CS. The panel found that this was **an other factor**.

1.4.102. **A recommendation has already been made at paragraph 1.4.91, that the Chief of Staff Field Army should ensure that force elements participating in Warrior commander qualifying course tactical exercises are qualified, current and competent for the role that they are being employed and with the equipment being used, to ensure there is a safe system of work and that risks are as low as reasonably practicable (ALARP) and tolerable.**

Defence Equipment and Support (DE&S)

1.4.103. DE&S was formed in 2007 following the merger of the Defence Procurement Agency and the Defence Logistics Organisation. It managed a vast range of complex projects to buy, support and supply equipment and services that the Royal Navy, the Army, Royal Air Force and UK Strategic Command needed to operate effectively. It had four domains: Ships, Land, Air and Strategic Enablers.

1.4.104. **Land domain**. The Land domain supplied and supported vehicles, personal equipment, weapons, ammunition, missiles, helicopters and a wide range of supporting infrastructure on behalf of their key Army, Strategic Command and strategic projects customers, as well as service personnel in the Royal Navy and Royal Air Force. It had three operating centres: Weapons, Helicopters and Land Equipment. The Land domain was led by Director General Land, a senior civil servant.

1.4.105. **Land Equipment Operating Centre (LEOC)**. The LEOC's mission was to provide through life equipment solutions to equip and support current and future operations for its customers across defence. It

was led by Director Land Equipment, a two-star military officer (major general). The LEOC consisted of six subordinate teams:

a. Future & Common Support Services.

b. Land Combat Vehicles.

c. Ajax.

d. Fires, Infrastructure & Manoeuvre Support.

e. Vehicle Support.

f. Soldier, Training & Special Projects.

1.4.106. **Vehicle Support Team**. The Vehicle Support Team provided the interface between industry and the Army for in-service military vehicles, including armoured tracked (including Warrior), wheeled 'protected mobility' platforms and logistics vehicles. It was led by a one-star military officer (brigadier). Along with a variety of other roles they provided management and ownership of safety panels, co-ownership of platform safety cases, hazard logs and risk registers to maintain the ALARP status of their attributed platforms.

1.4.107. **Warrior In-Service Support**. The Warrior In-Service Support were part of the Vehicle Support Team and was specifically responsible for the management of Warrior. It was led by a senior operations manager who was a level 4 civil servant.

1.4.108. **In-service Warrior Platform Safety and Environmental Panel (SEP)**. The SEP was formed of a panel of key stakeholders from DE&S, Army and industry partners who biannually reviewed the safety case to ensure the residual risks associated with Warrior were considered to be 'broadly acceptable or tolerable and ALARP'.

Land Warfare Centre (LWC)

1.4.109. The LWC was a two-star (major general) led organisation which sat within the Field Army's organisation. It was responsible for delivering collective and trade training. It had a number of subordinate organisations, one of which was ARMCEN (see figure 1.4.10).[44] The LWC also fulfilled the role of the training requirements authority (TRA) for the AIPCC and Warrior training.

Exhibit 157

[44] 20220506-SOI 101-HQ_LWC_Ways_of_Working-LWC-OS. Annex A.

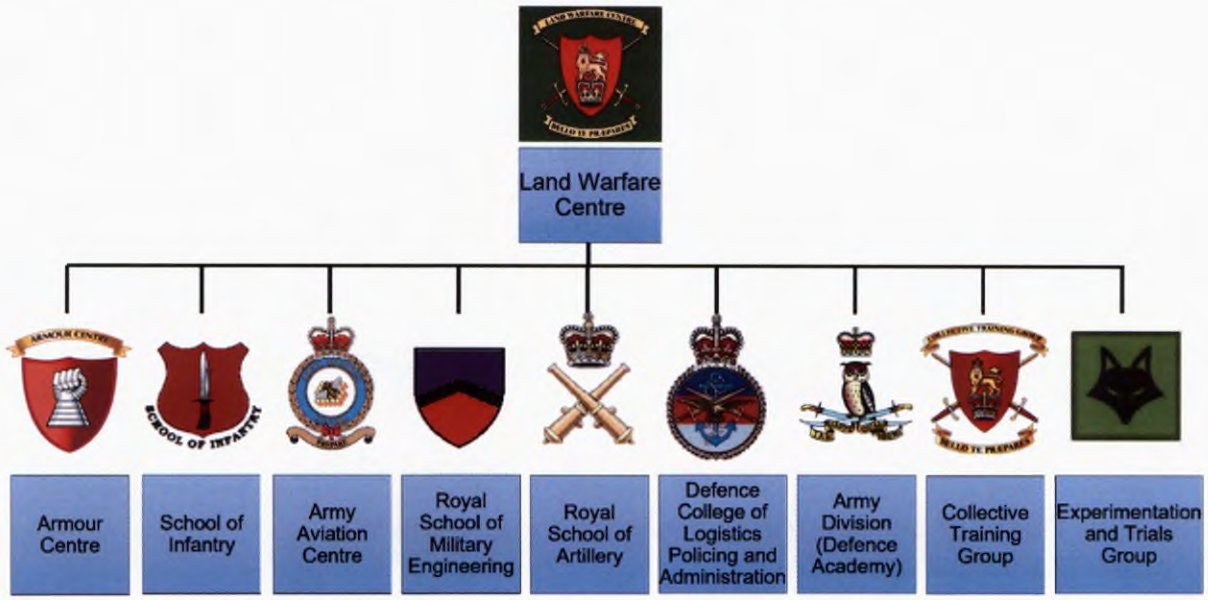

Figure 1.4.10 – Land Warfare Centre organisational chart

Armour Centre (ARMCEN)[45]

1.4.110. ARMCEN was responsible for delivering MCC training which consisted of initial trade training, subsequent trade training and continuous professional development and was commanded by an army colonel. It also acted as the training delivery authority (TDA) and provided the training design and assurance roles. A simplified organisational diagram (figure 1.4.11) shows the ARMCEN schools that delivered the AIPCC training.

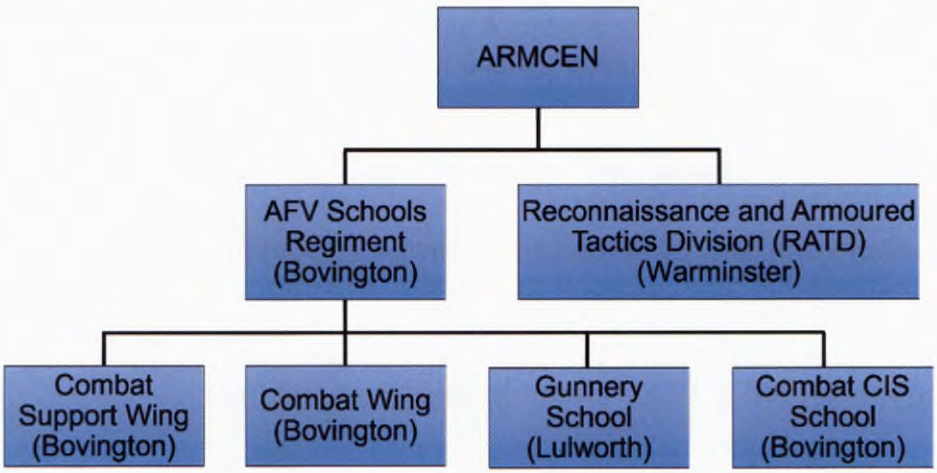

Figure 1.4.11 – ARMCEN schools

[45] ARMCEN has since been subsumed into the Combat Manoeuvre Centre (CMC).

Armoured Fighting Vehicle Schools Regiment (AFVSR)

1.4.111. AFVSR was based at Bovington. It delivered technical AFV driver and maintenance (D&M), AFV gunnery, and communications information systems (CIS) training. It was commanded by an army lieutenant colonel and had four schools / wings to deliver the training (see figure 1.4.11). Three of these schools delivered modules of the AIPCC course:

a. **Combat Support Wing**. The Combat Support Wing delivered the D&M module.

b. **CIS School**. The CIS School delivered the CIS module.

c. **Gunnery School**. The Gunnery School delivered the gunnery module.

1.4.112. Each school delivered the training objectives in accordance with the training performance statement (TPS) for their respective modules (see section 6). All were delivered in isolation and the panel noted that none of the schools were responsible for ensuring that subject matter was coherent or standardised across the four schools. As explored further in section 6, a training deficiency went unnoticed between the D&M module and the tactics phase, which led to a competency deficit in the debussing procedure. Had there been a single school responsible for the entirety (four modules) of the AIPCC, this may have been noticed and addressed. Exhibit 34

1.4.113. The panel concluded that the delivery of instruction to the AIPCC lacked a single entity that was responsible for ensuring subject content was correctly delivered (in accordance with the TPS) and coherent across all modules. This led to a training deficiency in the debussing procedure going unnoticed, and the resulting competency deficit increased the risk to life during the AIPCC Tactics module. The panel finds that the debussing training deficiency was a **contributory factor**.

1.4.114. **Recommendation. Director Land Warfare should consider appointing a responsible 'lead school' to oversee all armoured vehicle courses where several training providers are responsible for delivering different aspects of the course. This is to ensure training is coherent and delivered in line with the training performance statement.**

Reconnaissance & Armoured Tactics Division (RATD)[46]

1.4.115. The RATD was based at Warminster and was led by an army lieutenant colonel (SO1 RATD). It had two main training wings, Armoured Wing and Recce Wing (see figure 1.4.12). These wings delivered tactical training for AFV crew commanders (armoured and recce) and light close

[46] RATD has since been resubordinated into the Combined Arms Manoeuvre School.

recce commanders. Armoured Wing also delivered a Sub-unit Commander Course (SUCC).[47]

1.4.116. There was an armoured infantry training team in the Armoured Wing which consisted of:

a. **SO3 Armoured Infantry**. SO3 Armoured Infantry was an army captain who was also appointed as the assistant senior planning officer (ASPO) for Ex CS. They are referred to as the ASPO in this report.

b. **Senior Staff Instructor (SSI) Armoured Infantry**. SSI Armoured Infantry was an army colour sergeant who was also appointed as one of the assistant exercise conducting officers (AECO) for Ex CS. They are referred to as the AECO in this report.

c. **Staff Instructor (SI) Armoured Infantry**. SI Armoured Infantry was an army sergeant who was also appointed as an exercise assistant (EA) for Ex CS. They are referred to as EA1 in this report.

1.4.117. The armoured infantry training team were responsible for delivering the four-week armoured infantry tactics training to the AIPCC and Armoured Infantry Crew Commander (AICC) courses, which culminated in the two-week tactical exercise, Ex CS (see section 6).

Figure 1.4.12 – RATD organisational chart

[47] The SUCC was pre-employment training for majors who were about to assume command of a sub-unit (company / squadron) within the British Army or Royal Marines.

1.4.118. RATD had several key posts gapped, including that of the chief instructor. This led to other staff fulfilling roles for which they were not normally responsible, as secondary and tertiary duties. As explored in section 6, this impacted on some of the planning aspects of Ex CS. Witness 3

1.4.119. An identified area of concern was the staffing levels available to supervise student Warrior commanders during Ex CS. According to the exercise risk assessment in the Ex CS EASP, as a safety control measure, each Warrior was to have an instructor following it whilst driving cross-county. For Ex CS, this would have required 14 instructors to supervise a complete armoured infantry company. There were only three, one of which was dedicated to controlling the opposing force (OPFOR). In the panel's opinion the armoured infantry training team, whilst clearly very experienced, capable and knowledgeable, were not sufficiently scaled to safely supervise every student commander during Ex CS. Exhibit 7

1.4.120. The panel concluded that the RATD lacked sufficient instructors to safely plan, conduct and supervise Ex CS and that this was **an other factor**.

1.4.121. **Recommendation. Deputy Chief of the General Staff should ensure that those organisations responsible for delivering armoured vehicle tactical training, are sufficiently staffed with suitably qualified and experienced personnel to safely plan, conduct and supervise that training.**

Section 3 - Personnel / people

General

1.4.122. JSP 375 defined 'safe persons' as those: 'considered as a competent person, who have also been given the appropriate information, instruction, and supervision to enable them to carry out a specific activity.' [48] Exhibit 39

1.4.123. This section examines those people who were directly involved in the accident, including the deceased, and those who had a role in planning, conducting, supporting and supervising the exercise to determine if they were 'safe persons' as defined in JSP 375. It also examines those who delivered instruction of certain procedures to ensure they met the minimum mandated training requirements as defined by JSP 822,[49] and were current and competent instructors as defined by the relevant subject policy.

Personnel / people - executive summary

1.4.124. Verified records for some personnel were not provided to the panel and this made it difficult to gauge the competence of those who participated in Ex COMBAT SPIRIT. However, what was apparent from the analysis of the personnel related to this accident, was that many lacked armoured infantry and Warrior experience. This lack of experience at times led to personnel conducting tasks for which they were not qualified, not through a disregard of policy, but due to a lack of awareness of it. Some of those involved in the accident were undergoing formal training and their lack of experience and competence was to be expected. Until their competence was proven, it would have been reasonable to expect them to be closely supervised, but there was no recognised practice or policy in place to ensure this happened.

Definition of competency

1.4.125. The panel used the following references to determine the definition of a competent person:

a. **Health and Safety Executive**. 'Competence can be described as the combination of training, skills, experience and knowledge that a person has and their ability to apply them to perform a task safely. Other factors, such as attitude and physical ability, can also affect someone's competence.'[50]

b. **JSP 375**. 'A person who has the training, skills, experience and knowledge necessary to perform a task safely and is able to Exhibit 39

[48] JSP 375 Volume 1, Chapter 40 (V1.3 Jan 22). Page 2, paragraph 4-a.
[49] JSP 822 (V4.1 Nov 21). Page 129 paragraph 12.
[50] https://www.hse.gov.uk/competence/what-is-competence. Viewed 24 March 2023.

apply them. Other factors, such as attitude and physical ability, can also affect someone's competence'.[51]

c. **Pam 21**. 'To be deemed competent, an individual must be qualified or authorised, experienced and current and have the correct attitude to participate as exercise/range staff or as exercising troops'.[52] Exhibit 43

d. **AVSOs**. 'A person is deemed competent by having the required qualification, experience, currency and rank and they have also received the appropriate information, instruction, training and supervision'.[53] Exhibit 20

e. **DSA 03 DLSR - Equipment Standards Regulatory Schedule (ESRS) Version 1.09 - Nov 21**.[54] 'A person may be regarded as competent where they hold the suitable qualifications, have attained sufficient experience in applying their skills, knowledge and training.'[55] Exhibit 125

1.4.126. All definitions differed. However, they had similar criteria and broadly required a combination of the following attributes:

a. Training.

b. Qualification.

c. Experience.

d. Currency.

e. Rank.

1.4.127. The panel used these five attributes to determine competency of an individual.

Armoured vehicle (AV) continuation training and return-to-role training

1.4.128. One aspect for a number of personnel examined in this section was that of currency to operate as part of an AV crew or as a dismount operating from an AV, for which the policy is shown below. The panel was not presented with any validated records of either the continuation training or return-to-role training. Accordingly the panel could not determine if they Exhibit 20

[51] JSP 375 Volume 1, Chapter 40 (V1.3 Jan 22). Page 3, paragraph 19.
[52] Pam 21(2022). Page 1-6, paragraph 1-10.d.
[53] AVSO (2021). Page 1-3, paragraph 1-02.
[54] The aim of the Defence Safety Authority (DSA) Defence Land Safety Regulator (DLSR) ESRS was to ensure that equipment deemed as 'road-going' was inspected to the requirements of Land System Safety Regulator (LSSR).
[55] DSA03 DLSR, Land Systems Safety Regulator - Equipment Standards Regulatory Schedule (ESRS) Version 1.09 - Nov 21. Chapter 2, page 3, paragraph 2.1.

were current and, therefore, if they could be deemed as competent / safe persons.

1.4.129. **Continuation training**. AVSOs set out the policy and requirements for AV continuation training as follows:[56]

a. 'The need for an annual assessment for all trained personnel who operate as part of an AV crew whether as commanders, turret crew, drivers, or dismounts to ensure that basic skills are maintained.'

b. 'The need to ensure that all non-AV trained personnel who travel in or work from an AV receive mandated specified AV training prior to operating from any AV.'

1.4.130. **Return-to-role training**. Return-to-role training was aimed at those who had operated from or fought the vehicle but had not completed the continuation training in a period spanning 12-months or longer.

1.4.131. **Training and assessment matrix**. The continuation training and return-to-role training for those who operated from Warrior, either as crew or dismounts, was listed in a matrix appendix 1 to annex A of AVSOs.[57]

1.4.132. **Training records**. All details for those who had completed annual continuation training or return-to-role training were to be formally recorded by the unit.

RATD – key personnel

Exercise Director 1

1.4.133. The role of exercise director for Ex CS was fulfilled by SO1 RATD (referred to as Exercise Director 1 throughout this report),[58] the senior officer in RATD. Their wider remit as SO1 RATD was to oversee the delivery of RATD's spectrum of training as a training provider. This included delivering the AIPCC Tactics module. For the delivery of the AIPCC and Ex CS, they had two functions:

a. **Exercise director**. The roles and responsibilities of an exercise director were defined in Pam 21.[59] Normally a unit commanding officer or equivalent, their responsibilities included formally appointing a senior planning officer (SPO) in writing, and ensuring they had the necessary qualifications, rank and

Exhibit 43

[56] AVSO (2021).Chapter 6, annex A, page A-2, paragraph 5.a. and b.
[57] AVSO (2022). Page A-1-2.
[58] This is a military staff officer term that relates to the rank (grade 1 (SO1) - lieutenant colonel or equivalent, grade 2 (SO2) – major or equivalent, grade 3 (SO3) – lieutenant or equivalent).
[59] Pam 21 (2022). Page 2-2, paragraph 2-03.

experience. An exercise director did not require any formal qualification.

b. **SO1 RATD**. The roles and responsibilities of the SO1 RATD post were defined in the job specification for that position. The essential qualifications required were: | Exhibit 75

(1) Completion of the Commanding Officers of Training Establishment (COTE) course.

The job specification also required the post holder to have:

(2) Experience of armoured and / or platform recce.[60]

(3) Served as an armoured or recce sub-unit commander.

1.4.134. **Experience**. Exercise Director 1 commissioned as an officer into the [redacted] in 1997. During their career they had qualified as a commander on CR2, Warrior and Combat Vehicle Reconnaissance (Tracked) (CVR(T)). They had commanded armoured sub-units to squadron level, including sub-units equipped with Warrior. They had fulfilled various staff jobs and had deployed operationally in an armoured role. Exercise Director 1 joined RATD in 2021 as SO1 RATD. | Witness 1

1.4.135. **Qualifications**. Exercise Director 1 had not completed the COTE course due to an excessive waiting list. The course covered a number of DSAT related topics and was required for the role of SO1 RATD but was not essential for the role of an exercise director. | Exhibit 96

1.4.136. **Rank**. There was no stated rank for an exercise director. Pam 21 stated exercise directors were normally the unit commanding officers. The role of SO1 RATD was the equivalent of a commanding officer, therefore, met the guidance as stated in Pam 21. | Witness 1

1.4.137. The panel concluded that Exercise Director 1 was sufficiently experienced to fulfil the role of SO1 RATD and that of an exercise director for Ex CS. The panel find that Exercise Director 1's experience was **not a factor**.

1.4.138. The panel further concluded that Exercise Director 1's lack of the COTE competency had no bearing on their role as an exercise director. The panel finds this was **not a factor**.

[60] Platform recce refers to the conduct of reconnaissance activities in various vehicles or 'platforms', the infantry and armoured corps close recce platform was the Combat Vehicle Reconnaissance (Tracked) (CVR(T)) Scimitar.

Senior Planning Officer (SPO)

1.4.139. SO2 Recce from the RATD's Reconnaissance Wing fulfilled the role of SPO for Ex CS (they also used the title OC Recce Wing).

1.4.140. SPOs were to be formally appointed in writing by the exercise director. The roles and responsibilities of a SPO were listed in Pam 21.[61] For a blank-firing exercise such as Ex CS, the SPO role required the following: Exhibit 43

a. Sufficient experience for the training (the minimum rank of major was stipulated for exercises involving combat support and infantry support weapons – this did not apply to Ex CS).

b. Completed the mandatory safety risk management (SRM) training.

c. SA (M) qualification.[62]

d. Minimum rank of lieutenant or sergeant.

1.4.141. **Experience**. The SPO joined the Army in 1992 as a junior leader. After completing junior leader training and subsequent gunnery training, they joined the [redacted] in 1993. The SPO qualified as a CR2 driver in 2000 and as a CR2 commander in 2001 and had deployed on large-scale exercises in the UK and overseas. They commissioned as an officer in 2014 and fulfilled several roles with the [redacted], served as a grade 2 staff officer[63] in ARMCEN, and completed the Intermediate Command Staff College (Land) (ICSC(L)). The SPO was assigned to RATD as SO2 Recce in 2021. Witness 2

1.4.142. **Qualifications**. The SPO held the SA (M) qualification and had completed the SRM training.

1.4.143. **Rank**. The SPO was a major which was above the minimum rank required for the SPO role.

1.4.144. **Appointment**. The SPO recalled being appointed in writing by Exercise Director 1, but a copy of the appointment letter was not presented to the panel. The panel assessed that it was as likely as not that the SPO had been appointed in writing by Exercise Director 1 and that the record of the appointment had not been retained.

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[61] Pam 21 (2022). Page 2-3, paragraph 2-06 to 2-09.
[62] SA (M) qualification was a small arms qualification that qualified individuals to plan and conduct exercises involving blank ammunition and pyrotechnics.
[63] A staff officer is a generally a military officer who serve a commander of a military organisation in their command and control role through planning, analysis and information gathering, as well as by relaying, coordinating, and supervising the execution of their plans and orders. The grade relates to the rank (grade 1 (SO1) - lieutenant colonel or equivalent, grade 2 (SO2) – major or equivalent, grade 3 (SO3) – lieutenant or equivalent).

1.4.145. The panel concluded that the SPO was qualified and competent to fulfil the role, and this was **not a factor**.

Exercise Conducting Officer (ECO)

1.4.146. The Officer Commanding Armoured Wing (OC Armoured Wing) in RATD fulfilled the role of ECO and planning officer for Ex CS (they also used the title SO2 Armoured). The roles and responsibilities of a planning officer and ECO were listed in Pam 21.[64] The role of OC Armoured Wing was listed in the role's job specification.

Exhibit 43
Exhibit 77

1.4.147. **Planning officer**. Planning officers were responsible for the design of the training. They would normally also be the ECO. For a blank-firing exercise such as Ex CS, the planning officer role required the following:

a. Sufficient experience for the training.

b. SA (M) qualification.

c. Minimum rank of lance corporal.

1.4.148. **ECO**. ECOs were responsible for the safe conduct of the firing, in accordance with the plan. For a blank-firing exercise such as Ex CS, the ECO role required the following:

a. SA (M) qualification.

b. Competent with the weapons being used.

c. Have appropriate rank and experience to match the complexity of the exercise.

1.4.149. **OC Armoured Wing**. OC Armoured Wing's job specification stated they were to have the following essential qualifications and attributes:

a. CR2 / armoured crew commander's course.

b. SA (M) qualification or equivalent to discharge duties as an ECO and SPO.

c. ICSC(L).

d. Grade 2 staff officer.

e. Sub-unit command.

f. Extensive armoured and combined arms experience.

[64] Pam 21 (2022). Page 2-3, paragraph 2-10 and page 2-5 paragraph 2-15.

g. Experience of collective training (CT) 4[65] combined arms training (BATUS / BATUK / SPTA).[66]

1.4.150. **Experience**. The ECO joined the Army in 2007 and commissioned as a [redacted] officer. They had commanded an armoured recce troop and CR2 squadron, fulfilled training roles and had served operationally in Afghanistan. They had previously conducted combined arms exercises involving AFVs in Canada. The ECO joined RATD in 2020 as OC Armoured Wing responsible for the Armoured Wing's output. This was the sixth time the ECO had conducted Ex CS as a member of the exercise staff. Witness 3

1.4.151. **Qualifications**. The ECO held those qualifications stated for the roles.

1.4.152. **Rank**. The ECO had the appropriate rank and experience to match the complexity of the exercise.

1.4.153. The panel concluded that the ECO was qualified and competent to fulfil the role of OC Armoured Wing and that of a planning officer and ECO for Ex CS, and this was **not a factor**.

Assistant SPO (ASPO)

1.4.154. SO3 Armoured Infantry fulfilled the role of ASPO for Ex CS. The roles and responsibilities of an ASPO were listed in Pam 21.[67] The role of SO3 Armoured Infantry was listed in the role's job specification. Exhibit 43 Exhibit 78

1.4.155. **ASPO**. Whilst an ASPO was listed in the EASP, one is only appointed if the SPO lacks a competence for a particular aspect of the exercise, their roles and responsibilities being specific to that aspect. The ASPO was not actually required for Ex CS but the EASP was not updated to reflect this. The analysis, therefore, is of the ASPO's SO3 Armoured Infantry role, not of the ASPO role.

1.4.156. **SO3 Armoured Infantry**. The SO3 Armoured Infantry job specification listed the following as essential qualifications and attributes:

a. Defence Trainer course (Army).

b. AIPCC.

c. Junior Officers Tactics course (JOTAC).

d. Commanded an armoured infantry platoon.

[65] CT 4 level training consisted of Battlegroup training in a brigade context.
[66] British Army Training Unit Suffield (BATUS), British Army Training Unit Kenya (BATUK) and Salisbury Plain Training Area (SPTA) are the largest training areas available to the MOD, allowing for large scale tactical manoeuvre.
[67] Pam 21 (2022). Page 2-2, paragraph 2-04.

e. Recent armoured infantry experience.

1.4.157. **Experience.** The ASPO commissioned into the Army in 2016 as an infantry officer with [redacted]. They commanded an armoured infantry platoon after completing the AIPCC, and had participated in large scale combined arms exercises in Canada as well as deploying operationally as part of an armoured infantry unit to Estonia as a company 2IC. They joined the RATD in May 2022 and this was the first time they had conducted Ex CS as a member of the exercise staff. Witness 4

1.4.158. **Qualifications**. The ASPO held the appropriate qualifications for the role of SO3 Armoured Infantry.

1.4.159. **Rank**. Although no rank was stated in the job specification, SO3 positions are filled either by lieutenants or captains. SO3 Armoured Infantry was a captain and was an appropriate rank for the role.

1.4.160. The panel concluded that ASPO was suitably competent to fulfil the role of SO3 Armoured infantry, and this was **not a factor**.

Assistant ECO (AECO)

1.4.161. The AECO role was fulfilled by the SSI Armoured Infantry. The terminology 'Assistant' ECO was not defined in Pam 21 or the EASP. At the time of the accident the AECO was not fulfilling the role of an ECO. The SSI Armoured Infantry roles and responsibilities were listed in the SSI Armoured Infantry job specification. Analysis of the AECO appointment is covered in section 6. Exhibit 79

1.4.162. **SSI Armoured Infantry.** The SSI Armoured Infantry job specification listed the following as essential qualifications, competencies and experience:

a. **Qualifications / competencies**

(1) 'Defence Trainer course (Army)'.

(2) AICC.

(3) SA (M) qualification.

(4) Land Rover competence.

b. **Experience**

(1) Armoured infantry / Warrior battalion.

(2) Have high intensity conflict[68] or peace support operations.[69]

(3) Served as a Warrior platoon sergeant.

(4) Combat regimental duties.

1.4.163. **Experience**. The AECO joined the Army in 1999 and completed the Warrior gunnery course in 2000 and a Warrior commander's course in 2005. They had accumulated 20 years of armoured infantry experience, participating in large scale exercises in the UK and overseas as well as completing the AIPCC Tactics module. They had also deployed on operations to Iraq and Afghanistan in an armoured infantry role. The AECO was a Warrior gunnery instructor and fulfilled roles at the Armoured Trials and Development Unit (ATDU) and as a company quartermaster sergeant (technical) (CQMS(T)). This was the sixth iteration of Ex CS that the AECO had participated in as a member of the exercise staff. Witness 6

1.4.164. **Qualifications**. The AECO held the stated qualifications to fulfil the duties as the SSI Armoured Infantry.

1.4.165. **Rank**. The AECO held the rank of colour sergeant which was appropriate for the position held.

1.4.166. The panel concluded that the AECO was properly qualified and competent to fulfil the role of SSI Armoured Infantry, and this was **not a factor**.

Exercise Assistant 1 (EA1)

1.4.167. The role of EA1 on Ex CS was fulfilled by the SI Armoured Infantry, they were specifically responsible for controlling the OPFOR. The roles and responsibilities of an EA were listed in Pam 21.[70] The role of SI Armoured Infantry was listed in the role's job specification. Exhibit 43 Exhibit 80

1.4.168. **EA**. EAs were responsible for the safe conduct of those aspects of an exercise involving blank ammunition or pyrotechnics that were allocated to them. For a blank-firing exercise such as Ex CS, the EA role required the following:

a. To be competent with the weapons and pyrotechnics they were supervising.

b. Hold the minimum rank of lance corporal.

[68] High intensity conflict referred to combat operations such as those experienced in Iraq (OP TELIC) and Afghanistan (OP HERRICK).
[69] Peace support operations generally follow an agreement or ceasefire that has established an environment where the level of consent and compliance is high, and the threat of disruption is low.
[70] Pam 21 (2022). Page 2-4, paragraph 2-16.

1.4.169. **SI Armoured Infantry**. The SI Armoured Infantry job specification listed the following as essential qualifications, competencies and experience:

a. **Qualifications / competencies**

(1) Defence Train the Trainer (DTTT).[71]

(2) AICC.

(3) SA (M) qualification.

(4) Land Rover competence.

b. **Experience**

(1) Armoured infantry / Warrior battalion.

(2) Have high intensity conflict or peace support operations (this included any of the following: Op TELIC, Op HERRICK, BATUS, POLAND or BG TES EX).

(3) Served as a Warrior platoon sergeant.

(4) Combat regimental duties.

1.4.170. **Experience**. EA1 joined the Army in 2008 and was a qualified Warrior commander, Regimental Instructor Gunnery (RIG) and Regimental Warrior DMI. They had previously been employed as a Warrior sergeant and had conducted several combined arms exercises involving AFVs. They had conducted Ex CS on at least four occasions as part of the exercise staff prior to the accident. The panel assessed EA1's experience met the criteria set out in the job specification. Witness 9

1.4.171. **Qualifications**. EA1 held those qualifications stated for the roles they fulfilled.

1.4.172. **Rank**. EA 1 was a substantive sergeant and held an appropriate rank for the roles they fulfilled.

1.4.173. The panel concluded that EA1 was qualified and competent to fulfil the role of SI Armoured Infantry and that of an EA for Ex CS, and this was **not a factor**.

Observer 1

1.4.174. Observer 1 joined the Army in 2007 and was a qualified Warrior driver, gunner, commander and DMI. During Ex CS they shadowed the Witness 8

[71] The DTTT has been replaced by the Defence Trainer course (DTc). The course ensures trainers understand the key attributes of a trainer, effective delivery techniques, the realities of training, coaching and the use of technology.

AECO in preparation for joining the RATD staff later in 2022. Observer 1 was not employed in an official capacity during Ex CS.

1.4.175. The panel concluded that Observer 1's qualifications and experience were **not a factor.**

AFV Schools Regiment (AFVSR) – key personnel

Driving and maintenance instructors (DMIs)

1.4.176. DMIs from the Combat Support Wing delivered the D&M module on the AIPCC (see section 6). The panel reviewed these collectively to determine if they were competent to deliver the training.

1.4.177. The DMI job specifications stated that they were to be sergeants with the following attributes: Exhibit 83

a. Must have completed an armoured infantry DMI course on Warrior or Bulldog.

b. Must qualify as a School's Instructor and attend a Pre-Employment Training (PET) course.

c. Must have acted as a DMI at parent unit.

d. Must have completed DTTT.

e. Must have completed the Army Recruiting and Training Division (ARTD) Staff Leadership School (ASLS) Course.

1.4.178. Whilst the DMIs who taught during the D&M module met the stated criteria, it was not stipulated that they were to have completed the AICC course (an ARMCEN delivered AFV tactics course). Had they not completed the AICC course the DMIs would be classed as not 'fully competent' Warrior commanders in accordance with the AVSO definition. Three of the four had not completed the AICC course. Exhibit 20 Exhibit 143 Exhibit 144 Exhibit 145 Exhibit 146

1.4.179. DMIs taught the technical processes and procedures of commanding Warrior during the D&M module but did not cover the tactical aspects. However, the TPS for the D&M module required certain aspects of commanding Warrior to be trained to Training Category 2. This entailed commanding under realistic conditions, which should have included commanding 'closed down'[72] and debussing personnel from Warrior in a tactical context (training categories are explained in section 6).

[72] Crews could operate with hatches locked open with heads protruding from the vehicle, this allowed for greater situational awareness, but afforded less protection. When tactical situations dictate, crews operated 'closed down' with hatches closed; this afforded greater protection, but due to restricted fields of view through the periscopes, situational awareness was reduced.

1.4.180. AV commanders were only deemed to be 'fully competent' when tactically trained by the appropriate ARMCEN delivered AFV tactics course. Had the DMIs themselves not undergone the formal tactical training, it is likely that they would have been disadvantaged when teaching vehicle command aspects under realistic conditions. As explored fully in section 6, a key learning point (KLP) was not delivered to the correct training category, which may have been a result of instructor training deficits. Exhibit 20

1.4.181. The panel concluded that the job specifications for the DMIs in the AFVSR Combat Support Wing lacked a key qualification that led to not 'fully competent' AV commanders being employed as DMIs. This contributed to course content not being delivered to the correct level during the D&M module of the AIPCC, which the panel finds was a **contributory factor**.

1.4.182. **Recommendation. Director Land Warfare should mandate that those employed as armoured vehicle (AV) driving and maintenance instructors, must themselves be fully competent AV commanders, where the subject matter requires training to be taught under realistic conditions, including in a tactical context, to ensure they are competent to deliver such training.**

5 RIFLES – key personnel

Company commander

1.4.183. The company commander was a member of the SET troops and was the commander of the armoured infantry company during Ex CS. Armoured infantry company commanders command their own FV511 when deployed in the armoured infantry role. This was not the case during Ex CS due to a lack of Warriors, which resulted in the company commander having to operate from a Land Rover FFR.

1.4.184. **Experience**. The company commander commissioned as an infantry officer in 2009. They fulfilled several non-armoured infantry appointments before promoting to major. They assumed command of D Company in May 2020, despite having no previous experience in armoured infantry roles. At the time of the accident the company commander was approaching the end of their two-year assignment in the role. During their tenure as company commander they spent limited time operating with AVs or commanding D Company in the armoured infantry role due to the nature of the company's other commitments. Witness 11

1.4.185. **Qualifications**

a. **Sub-unit command**. The company commander had completed ICSC(L) and the Sub-Unit Commanders Management Exhibit 97
Exhibit 137
Exhibit 149
Exhibit 156

Course (SUCMC).[73] These were mandated career progression courses that were to be conducted in line with the Combat Arms Policy for Employment (CAPE)[74] for a major to be employed as a sub-unit commander (company commander). The Officer Career Development Handbook also stated that it was mandated for officers appointed as infantry company commanders to attend the Sub-Unit Commanders Course Special to Arms and Combined Arms (SUCC StA and CA).[75] The company commander had attended the SUCC StA element, but not the CA element (the course was cancelled due to COVID).

b. **Warrior / armoured infantry**. The company commander conducted Warrior commander training whilst in D Company. The training consisted of CIS, D&M and gunnery, which was conducted as distributed training (DT).[76] This training did not include an AFV tactics course, as there was no tactics course specifically for armoured infantry company commanders. This differed to the armoured infantry platoon commanders, who conducted their Warrior training as part of the AIPCC which included a tactics phase. As the company commander did not gain the tactical qualification,[77] they could not be classed as a 'fully competent' Warrior commander and were not qualified to command Warrior in tactical situations, but could command Warrior on non-tactical point-to-point moves.

Exhibit 20

1.4.186. **Currency**. The panel was not presented with validated evidence confirming that the company commander had completed either the AV platform continuation training or the return-to-role training, which were mandated by AVSOs to demonstrate currency to either crew Warrior or operate with it. However, during Ex CS the company commander did not operate from Warrior.

1.4.187. **Rank**. The company commander was of the correct rank to fulfil the role of a sub-unit commander.

1.4.188. The company commander was an experienced officer who was suitably qualified in accordance with CAPE for sub-unit command. However, when applying JSP 375's definition of a competent person ('[a] person who has the training, skills, experience and knowledge necessary to perform a task safely and is able to apply them'),[78] there were two elements that the company commander did not possess for commanding an armoured infantry company: training and experience. The company

Exhibit 39

[73] The SUCMC was pre-employment (PET) for all majors appointed to sub-unit command. The aim of the course was to provide the generic functional knowledge and professional understanding required for all majors selected for sub-unit command appointments.
[74] The CAPE identified career employment and promotion policy for the Royal Armoured Corps (RAC), Infantry and Small Arms School Corps (SASC) soldiers and officers, both regular and reserve.
[75] The SUCC StA and CA was designed to provide officers with the appropriate knowledge and understanding of combined arms' tactics in order to prepare them for command of their sub-units in the contemporary operating environment.
[76] JSP 822 (V4.1 Nov 21) Part 1, Section 10 – Glossary, page 245. DT is the formal training to deliver the TPS that is undertaken away from the organisation responsible for the development, maintenance and management of the training.
[77] The JPA competency awarded on completion of AIPCC was ARMOURED PL COMD or AICC.
[78] JSP 375 Volume 1, Chapter 40 (V1.3 Jan 22). Page 3, paragraph 19.

commander had not undertaken either an ARMCEN delivered armoured infantry tactics course or completed the SUCC CA, nor had they commanded an armoured infantry company during company level tactical training. For these reasons the panel was of the opinion that the company commander had not met the criteria as laid down in JSP 375 to be deemed a 'safe person' in the role of an armoured infantry company commander.

1.4.189. Ex CS presented a number of challenges such as inexperienced SET troops, student Warrior commanders, resourcing issues, fleet management issues and a lack of key commanders within the company. When combined with the complexities of armoured infantry and combined arms operations, the company commander's lack of armoured infantry training and experience added to the risk that these challenges presented, which had potential to compromise the safe conduct of the company's armoured infantry tactical activities.

1.4.190. The panel concluded that the company commander did not have sufficient armoured infantry experience, nor had they received the appropriate and mandated training to be deemed a competent person, as defined by JSP 375, in the role of an armoured infantry company commander. This increased the risks to an already challenged and complex exercise involving student Warrior commanders. The panel finds that the increased risk of company commanders lacking armoured infantry experience and qualifications was **an other factor**.

1.4.191. **Recommendation. Director Land Warfare should conduct a training gap analysis and implement measures to ensure that sub-unit commanders who re-role into armoured or mechanised infantry, are appropriately trained to be deemed competent for the role in which they are to be employed.**

Warrior Sergeant Major (WSM)

1.4.192. The role of a WSM was to advise the company commander on all matters pertaining to Warrior, including tactical employment, and to assist with the fleet management and company's armoured infantry competencies. WSMs also assisted the company commander in commanding their FV511.[79] Exhibit 29

1.4.193. **Experience**. The WSM joined the Army in 2001 and had served with the armoured infantry since 2002. They had vast experience as a Warrior gunner, driver, commander and DMI, and had deployed operationally as part of an armoured infantry unit. The WSM assumed the role of D Company's WSM in April 2022. Witness 13

1.4.194. **Currency**. The WSM was current for the role of WSM, but validated evidence was not presented to the panel confirming the WSM had

[79] Doctrine Note 19/02 - Warfighting Tactics Part 5A: Armoured and Armoured Infantry Subunit Tactics. Page 1-9, paragraph 1-20.b.

conducted the necessary AV continuation training required to operate with Warrior. However, during Ex CS the WSM did not operate from Warrior.

1.4.195. **Rank**. The WSM was of the correct rank for their role.

1.4.196. **Qualifications**. The WSM held the qualifications required to fulfil the role of a WSM. They had qualified as a Warrior gunner, driver, commander and DMI.

1.4.197. The panel concluded that the WSM was suitably competent to fulfil the role of a WSM during Ex CS, and this was **not a factor**.

Company 2IC

1.4.198. The company 2IC was in post preceding Ex CS and was responsible for managing the company's commitments, which included Ex CS. They deployed on Ex CS for the first four days of the exercise, operating from a Bulldog. The company 2IC left the exercise early to undertake a career course.

1.4.199. **Experience**. The company 2IC commissioned from the Royal Military Academy Sandhurst (RMAS) in 2020 and was subsequently posted to 5 RIFLES. They qualified as a Warrior gunner and commander, and completed the Platoon Commander's Battle Course (PCBC). They then deployed as part of D Company on operations in Estonia where they operated as a platoon commander in a light (dismounted) role (not operating from Warrior). The company 2IC completed the tactics phase of the AIPCC in 2021 and assumed the role of company 2IC in April 2022. Witness 48

1.4.200. **Rank**. The company 2IC was of sufficient rank to fulfil the role of company 2IC during Ex CS.

1.4.201. **Currency**

a. **AV**. The panel was not presented with validated evidence confirming that the company 2IC had completed either the AV platform continuation training or the return-to-role training and, therefore, could not determine if they were current to operate from Bulldog during Ex CS.

b. **Company 2IC role**. The company 2IC's experience preceding their appointment as a platoon commander and completion of the AIPCC Tactics module ensured that they were suitably current for the role of company 2IC during Ex CS.

1.4.202. **Qualifications**. The company 2IC had followed the career progression from armoured infantry platoon commander to company 2IC

and undertaken the qualification courses commensurate with the role of company 2IC (there were no stated qualifications specifically for the role).

1.4.203. The panel concluded that the company 2IC was suitability competent to fulfil the role as company 2IC, and this was **not a factor**.

Platoon Commander 1

1.4.204. Platoon Commander 1 was the commander of the FV511, which was later involved in the accident (referred to herein after as callsign (C/S) 42A), for the move to the Ex CS assembly area on SPTA. Platoon Commander 1 was also responsible for the conduct of the CFT on C/S 42A in May 2022 (see section 5). During the preliminary phases of the exercise, they remained in the rear of the vehicle acting as a deputy vehicle commander (DVC). In the latter stages of Ex CS Platoon Commander 1 fulfilled the role of company 2IC.

1.4.205. **Experience**. Platoon Commander 1 commissioned into 5 RIFLES in December 2020 and completed PCBC and AIPCC in quick succession after commissioning. Due to safety restrictions in place at the time with Warrior, not all training objectives were achieved during the AIPCC. They subsequently completed them during a later course early in 2022. The deployment onto Ex CS was the first time that Platoon Commander 1 had commanded an FV511. They had limited armoured infantry and Warrior experience, mainly due to the non-armoured infantry taskings during their tenure in D Company. Witness 12

1.4.206. **Currency**. The panel was not presented with validated evidence confirming that Platoon Commander 1 had completed either the AV platform continuation training or the return-to-role training, therefore could not determine if they were current to operate from Warrior during Ex CS.

1.4.207. **Rank**. Platoon Commander 1 was of the correct rank for the role of platoon commander and company 2IC when they assumed that role part way through Ex CS.

1.4.208. **Qualifications**. Platoon Commander 1 had the appropriate qualifications for the role of an armoured infantry platoon commander and was a fully competent Warrior commander.

1.4.209. The panel concluded that Platoon Commander 1 was suitably qualified and experienced to fulfil the role of a Warrior commander during Ex CS and that this was **not a factor**.

Company Quartermaster Sergeant (Technical) (CQMS(T))

1.4.210. The CQMS(T) was responsible for the management of the A Company's Warrior fleet. At the time of the accident they were also Exhibit 29

managing D Company's Warriors as their CQMS(T) post had been gapped for the previous four weeks. It was the responsibility of the CQMS(T) to ensure the Warrior fleet was maintained effectively.

1.4.211. **Experience**. The CQMS(T) joined the Army in 2000 and served in [redacted] prior to being posted to 5 RIFLES in 2018 as a Warrior sergeant, before subsequently completing a Warrior gunnery and commander's course. They then served as a sergeant instructor at the Infantry Training Centre (Catterick), before assuming the role of A Company's CQMS(T) in 2020. At the time of the accident the CQMS(T) had been in post for approximately two years and had accumulated a broad knowledge of Warrior fleet management. Witness 42

1.4.212. **Rank**. The CQMS(T) was of the correct rank for the role.

1.4.213. **Qualifications**. There were no qualifications specific to their post. However, they were required to use JAMES[80] to manage the companies' Warrior fleets and they had completed the appropriate JAMES training.

1.4.214. The panel concluded that the CQMS(T) was suitability competent to fulfil the role, and this was **not a factor**.

Inspector 1

1.4.215. Inspector 1 was a REME sergeant class 1 vehicle mechanic and vehicle inspector in 5 RIFLES. They were responsible for conducting the mandated equipment inspection (MEI) on C/S 42A in March 2022.

1.4.216. **Experience**. Inspector 1 joined the Army in 2008 and had served mainly with logistics and light infantry units. Their technical expertise was with light (non-armoured) vehicles. They joined 5 RIFLES in 2021 and this was the first role where they were responsible for the maintenance and inspection of AVs. Witness 44

1.4.217. **Rank**. Inspector 1 was of the correct rank required for the role.

1.4.218. **Qualifications** Exhibit 119

a. Inspector 1 was a qualified class 1 vehicle mechanic and vehicle inspector.

b. The officer commanding the unit's REME Light Aid Detachment (OC LAD) had recorded in the unit's appointment of inspector log (Form MT 936 (A2)), that Inspector 1 met the

[80] JAMES (Joint Asset Management and Engineering Solutions). This was the engineering management information system used to record military equipment (including vehicles) engineering records.

requirements of a competent person for the purpose of conducting MEIs.

c. Inspector 1 had completed a Warrior commander's course while at 5 RIFLES, which was required for them to command a Warrior FV512 (repair variant).

1.4.219. Inspector 1 inspected C/S 42A in March 2022. Whilst they were qualified and had gained some experience inspecting Warrior during their short tenure with 5 RIFLES prior to this inspection, it was evident that they felt they lacked the experience of the Warrior platform. Witness 44

1.4.220. The panel concluded that Inspector 1 was suitably qualified as a vehicle inspector but lacked experience of the Warrior platform. The panel further concluded that an inspector's lack of platform type experience could introduce risk of errors and omissions during vehicle inspections, and therefore, is **an other factor**.

1.4.221. **Recommendation. Deputy Chief of Staff Field Army should carry out a review of the employment of vehicle inspectors to provide assurance that they have appropriate experience on the vehicle type for which they are expected to inspect.**

Inspector 2

1.4.222. Inspector 2 was the vehicle mechanic responsible for recording onto JAMES the MEI that was conducted on C/S 42A in March 2022.[81]

1.4.223. **Experience**. Inspector 2 joined the Army in 2015 and qualified as a vehicle mechanic class 3. They subsequently qualified as vehicle mechanic class 2, then as a class 1 in 2020 and was assigned to 5 RIFLES. Inspector 2 specialised on Trojan and Titan (engineer armoured vehicles) while serving at an armoured engineer unit. Inspector 2 had limited exposure to Warrior prior to being posted to 5 RIFLES in March 2020. Witness 45

1.4.224. **Qualifications** Exhibit 120

a. Inspector 2 was a qualified class 1 vehicle mechanic and vehicle inspector, and was suitably qualified to record MEIs on JAMES.

b. The officer commanding the unit's REME Light Aid Detachment (OC LAD) had recorded in the unit's appointment of inspector log (Form MT 936 (A2)), that Inspector 2 met the requirements of a competent person for the purpose of conducting MEIs.

[81] The MEI was recorded on JAMES in April 2022. Inspector 1 deployed abroad before they were able record the MEI on JAMES and Inspector 2 recorded it in their absence which accounted for the delay from the conduct of the MEI and it being recorded on JAMES.

1.4.225. **Rank**. Inspector 2 was the correct rank for the role.

1.4.226. The panel concluded that Inspector 2 was suitability qualified and experienced to fulfil the role of a vehicle inspector and record MEIs onto JAMES, and this was **not a factor**.

Warrior Sergeant 1

1.4.227. Warrior Sergeant 1 augmented D Company as they had no Warrior sergeants in post (there should have been three in the company). They joined D Company one week before the start of Ex CS and was tasked to run AVSO refresher training with a junior non-commissioned officer (JNCO) to ensure the SET troops were current and competent to operate with AV.

1.4.228. **Experience**. Warrior Sergeant 1 joined the Army in 2007 and served solely with 5 RIFLES. They were a qualified Warrior driver, gunner and commander and had completed the AICC course. They were also a Bulldog DMI. This was the third Ex CS they had supported, each time as a Warrior sergeant. Witness 14

1.4.229. **Rank**. Warrior Sergeant 1 was of the correct rank required for the role.

1.4.230. **Qualifications**. Warrior Sergeant 1 was qualified for the role of Warrior sergeant and that of a Warrior commander.

1.4.231. **Currency**. The panel was not presented with validated evidence confirming that Warrior Sergeant 1 had completed either the AV platform continuation training or the return-to-role training. Therefore, the panel could not determine if they were current to operate from Warrior during Ex CS.

1.4.232. The panel could not determine whether Warrior Sergeant 1 had conducted AV continuation training, but concluded that they were suitability qualified and experienced to fulfil the role of a Warrior sergeant and conduct D Company's AVSO refresher training in preparation for Ex CS. The panel finds that Warrior Sergeant 1's competence was **not a factor**.

OPFOR 1

1.4.233. OPFOR 1 commanded a small team of soldiers from D Company who were acting as an OPFOR during Ex CS. OPFOR 1 witnessed the accident and was one of the first to reach the casualty after it occurred.

1.4.234. **Experience**. OPFOR 1 originally joined the Army in 2014 and served with [redacted]. After two years they left the Army, then re-joined in 2021, this time with [redacted]. They had previous experience Witness 28

as a Warrior gunner from their original service in the Army but had only operated in the dismounted role since re-joining.

1.4.235. **Rank**. OPFOR 1 was of sufficient rank to fulfil the role as a member of the OPFOR.

1.4.236. **Qualifications and currency**

a. **MATTs / ITRs**. Soldiers were to undertake Mandated Annual Training Tests (MATTs). MATTs were replaced in April 2022 by the Individual Training Requirement (ITR). The conduct of MATTs and ITR maintained the minimum standard of individual military knowledge, skills, experience and behaviours required of a competent soldier, both had several components. The relevant components for OPFOR 1 to be competent to undertake their duties during Ex CS (as stipulate in the Ex CS's EASP), were the weapon handling test for the weapon type being used (valid for six months from the date of test) and battlefield casualty drills (valid for 12 months from the date of test). The panel considered the battlefield casualty drill ITR relevant as OPFOR 1 was the first person to reach the casualty after the accident. Exhibit 7 Exhibit 133 Exhibit 134

b. ORFOR 1 had completed the battlefield lifesaving and casualty drill MATTs on 12 May 2021 and then conducted the battlefield casualty drills ITR on 10 July 2022. Therefore, on the day of the accident (21 June 2022), they would not have been in date for the casualty drill mandated training. Nor were they in date for a weapon handling test (it was conducted on 27 June 2021 and expired on 26 December 2021).

1.4.237. The panel concluded that OPFOR 1 was out of date for mandated training, which included the battlefield casualty drills and a weapon handling test. Whilst this was a requirement for their participation in Ex CS, the panel finds that the lack of ITR currency was **not a factor**.

C/S 42A crew

Student Commander 1

1.4.238. Student Commander 1 was a student on the AIPCC, of which Ex CS was the final element of the course. They were undergoing the tactical training required to train and assess them for their role as an armoured infantry platoon commander and to deem them a 'fully competent' Warrior commander. They were in the role of a platoon commander and simultaneously commanding C/S 42A at the time of the accident.

1.4.239. **Experience**

a. **Platoon command**. Student Commander 1 commissioned as an infantry officer in 2021 and joined the [redacted] in January 2022. Their experience of platoon command was limited to their initial officer training conducted at RMAS Sandhurst and the PCBC conducted in December 2021. Witness 35

b. **AV**. Student Commander 1's experience of operating Warrior was limited to that gained during the preceding three months whilst on the AIPCC, which started in March 2022. During this time, they had conducted the CIS, D&M and the gunnery modules of the course. Student Commander 1 had not previously operated with dismount troops prior to starting Ex CS.

1.4.240. **Qualifications**

a. **Platoon command**. Student commander 1 had completed the PCBC and was competent to command an infantry platoon in the light (dismounted) role. Exhibit 124

b. **AV**. On completion of the CIS, D&M and gunnery modules of AIPCC they were qualified to command Warrior on point-to-point non-tactical moves. Until they had completed the tactics module they were deemed not 'fully competent'. However, they were permitted to command tactically whilst conducting the tactics phase of the AIPCC. Exhibit 20

1.4.241. **Currency**

a. **Platoon command**. There was no defined 'currency' for a platoon commander to command an infantry platoon. However, Student Commander 1's recent experience on the PCBC meant that they were current on all tactical procedures for commanding a dismounted infantry platoon.

b. **AV**. Student Commander 1 was two days from the end of the AIPCC. They had covered most training objectives (TOs), recently undertaken training on the Warrior platform and had current knowledge. However, the bulk of the course related to the FV510. Their exposure to the FV511 was limited, and certain procedures from that platform had not been taught or practiced (such as debussing). Therefore they did not possess 'current' knowledge for some of the key procedures related to the platform Student Commander 1 was commanding at the time of the accident. Exhibit 117

1.4.242. **Rank**

a. **Platoon command**. Student Commander 1 was a second lieutenant, which was an appropriate rank to command an infantry platoon.

b. **AV**. The minimum rank required by AVSOs to command an AV is lance corporal, Student Commander 1 met this criterion.

1.4.243. JSP 375 stated: 'personnel undergoing training are not considered competent until they have the combination of training, skills, experience, and knowledge and the ability to apply them to perform a task safely'.[82] Student Commander 1 had not undertaken the correct level of training to debus personnel from a Warrior during the D&M module (covered in detail in section 6). Therefore, whilst undertaking the tactics module they did not have the requisite training, skills, experience and knowledge to safely debus personnel from an FV511 and could not be considered competent in this task.

1.4.244. In the panel's opinion, until such a point that an AV commander was deemed 'fully competent', they could not reasonably be expected to fulfil the responsibilities of an AV commander sufficiently to ensure the safe operation of the vehicle and the safety of its crew and passengers during a tactical exercise. In such circumstances, it would have been reasonable to expect a degree of supervision to ensure it was safely operated during the tactical actions (such as debussing). This was reflected in JSP 375 which stated: 'training is closely supervised by the Chain of Command to ensure Safe Practice is implemented.'[83] Such supervision was not in place (see paragraphs 1.4.485 to 1.4.490 (safety supervision - AV)).

1.4.245. The panel concluded that Student Commander 1 was not a fully competent Warrior commander and, therefore, could not be classed as a 'safe person' as defined by JSP 375. As they were not competent to fulfil the responsibilities of an AV commander during the tactical phase of the AIPCC, there should have been appropriate supervision to ensure the safe operation of the Warrior and the safety of the crew and passengers. At the time of the accident there was no effective supervision in place and the panel finds this was a **contributory factor**.

1.4.246. **Recommendation. Director Land Warfare should ensure that student armoured vehicle (AV) commanders are adequately supervised during tactical exercises to ensure the safe operation of AVs and the safety of the crew, passengers and exercising troops.**

Gunner 1

1.4.247. Gunner 1 was C/S 42A's gunner at the time of the accident. The definition of an AV gunner was stated in AVSOs as: Exhibit 20

[82] JSP 375, Volume 1. Chapter 40, page 5, paragraph 25.
[83] JSP 375, Volume 1. Chapter 40, page 6, paragraph 31.

> 'A service person that operates the platform's weapon systems under the control and supervision of a qualified commander.'[84]

During Ex CS, gunners simulated operating the Warrior's machine gun and 30mm cannon. Accordingly, they had to be competent for the role even though they were not firing live ammunition.

1.4.248. **Experience**. Gunner 1 joined the Army in 2015. They joined 5 RIFLES in 2018 and qualified as a Warrior gunner in 2020. They had participated in combined arms exercises in Canada and deployed operationally as part of an armoured infantry unit. They had taken part in Ex CS previously as a dismount operating from Warrior, and had recently returned from a training exercise in Canada prior to deploying on Ex CS. In the panel's opinion Gunner 1 was suitably experienced to fulfil the role of a Warrior gunner during Ex CS. Witness 22

1.4.249. **Currency**. The panel was not presented with validated evidence confirming that Gunner 1 had completed either the AV platform continuation training or the return-to-role training and, therefore, could not determine if they were current to operate from Warrior during Ex CS.

1.4.250. **Rank**. The minimum rank of a gunner was private, Gunner 1 met this criterion. Exhibit 20

1.4.251. **Qualifications**. Gunner 1 had completed the Warrior gunner's course in 2020 and was qualified to act as a Warrior gunner. Exhibit 128

1.4.252. The panel could not determine whether Gunner 1 had conducted AV continuation training, but concluded that they were suitability qualified and experienced to fulfil the role of a Warrior gunner during Ex CS. The panel finds that Gunner 1's competence was **not a factor**.

Driver 1

1.4.253. Driver 1 was C/S 42A's driver at the time of the accident. The definition of an AV driver was stated in AVSOs as: Exhibit 20

> '[A] service person that had received the appropriate AV system training specific to the platform for their role' and 'responsible for driving the AV under the control and supervision of a qualified AV Commander. They are to be trained and hold the relevant licence for the platform type they are driving.'

1.4.254. **Experience**. Driver 1 joined the Army in 2019 and qualified as a Warrior driver later that year whilst with 5 RIFLES. They had taken part in Ex CS on three previous occasions, both as a dismount and as a Warrior driver. They had driven the FV510 variant before this exercise, but not the Witness 32

[84] AVSO (2021).Chapter 1, page 1-9, paragraph 1-12.a.

FV511. In the panel's opinion Driver 1's lack of experience of the FV511 led to some knowledge gaps of the platform. For example, Driver 1 did not realise the FV511 had a rear door alarm. The lack of FV511 experience and knowledge gaps on that variant was commonplace amongst the Warrior crews interviewed.

1.4.255. **Currency**. The panel was not presented with validated evidence confirming that Driver 1 had completed either the AV platform continuation training or the return-to-role training, therefore, could not determine if they were current to operate from Warrior during Ex CS.

1.4.256. **Rank**. The minimum rank of a driver was private, Driver 1 met this criterion. Exhibit 20

1.4.257. **Qualifications**. Driver 1 had completed the Warrior driver's course in 2019 and was qualified to drive C/S 42A during Ex CS. Exhibit 108

1.4.258. The panel concluded that Driver 1 was suitability qualified and experienced to fulfil the role of a Warrior FV510 driver, although currency could not be determined due to the lack of validated records. Driver 1 also lacked experience of the FV511 variant which led to some knowledge gaps of the platform, notably regarding the rear door alarm. This was common amongst Warrior crews and in the panel's opinion the general lack of FV511 competence amongst Warrior crews was **an other factor**.

1.4.259. **Recommendation. Director Land Warfare should ensure that armoured vehicle (AV) crews are given the appropriate information, instruction, training and supervision during their AV qualifying courses to ensure they are competent to operate the specific variants of AVs which they can be expected to operate.**

Dismount 1

1.4.260. Dismount 1 was travelling in the section working compartment of C/S 42A at the time of the accident. Their role was not clearly defined. Their understanding was that they could command the Warrior if required (should the commander dismount), which they did at one stage during the exercise - this role is known as a DVC (deputy vehicle commander), a term Dismount 1 was not familiar with. Alternatively they could operate dismounted, supporting 2Lt George in the dismounted role if required. Both roles are examined in this section.

1.4.261. **Experience**. Dismount 1 joined the Army in 2018 and had served solely with 5 RIFLES. They promoted to lance corporal in 2020 and had experience as a qualified CVR(T) driver, and as a qualified Warrior gunner and commander. They had however, not completed the formal Warrior tactical training. Witness 16

1.4.262. **Rank**. As a lance corporal Dismount 1 had sufficient rank to fulfil the role of a Warrior commander and to operate dismounted if required.

1.4.263. **Qualifications**. Dismount 1 had not conducted formal tactical training when they qualified as a Warrior commander. Therefore, they were deemed not 'fully competent' and were not qualified to command Warrior tactically without a waiver. A waiver had not been issued permitting Dismount 1 to command Warrior tactically during Ex CS. Exhibit 20

1.4.264. The panel **observed** that Dismount 1 had been allowed to command a Warrior during Ex CS despite not being qualified to do so, which highlighted a general lack of understanding of the policy regarding those Warrior commanders who had not been tactically trained by an appropriate ARMCEN delivered AFV tactics course.

2Lt George

1.4.265. 2Lt George was a platoon commander in D Company. As students on the AIPCC course were fulfilling the roles of platoon commanders during Ex CS, 2Lt George was left without a defined role. Throughout the exercise they fulfilled a number of dismounted roles. At the time of the accident they were acting as a platoon sergeant operating from C/S 42A.

1.4.266. **Experience**

a. 2Lt George joined the regular Army in January 2021 and commissioned as an infantry officer in December 2021. They completed PCBC in April 2022 and joined D Company, 5 RIFLES in May 2022 as a platoon commander. They deployed on Ex CS on 15 June 2022 (joining the exercise 24-hours after the start as the vehicle they were travelling in had a mechanical fault which delayed their departure).

b. Before joining the regular Army, 2Lt George commissioned as an Army Reserve officer in September 2017 and served with 5 RRF[85], an Army Reserve infantry unit. As a reservist they also served six months with 1 RRF, a regular armoured infantry battalion.

c. 2Lt George's experience with Warrior was limited, having only spent a matter of weeks with 5 RIFLES prior to the accident, although it was as likely as not that they had some exposure whilst serving as a reservist with 1 RRF.

d. 2Lt George's reserve service and their experience of platoon command at RMAS and PCBC (conducted in April 2022) would have provided some exposure and experience of

[85] RRF – Royal Regiment of Fusiliers.

the platoon sergeant's role (the role they were fulfilling at the time of the accident) whilst undertaking PCBC.

1.4.267. **Qualifications**. The panel was not presented with validated evidence confirming that 2Lt George had completed any formal Warrior training, including the mandatory AV continuation training and workplace induction programme (WIP). Accordingly, the panel was unable to establish if 2Lt George was deemed competent to operate from Warrior as a dismount.

1.4.268. **Rank**. The role 2Lt George was fulfilling at the time of the accident was normally fulfilled by a sergeant. 2Lt George held a higher rank than this.

1.4.269. The panel **observed** that 2Lt George was suitably qualified to fulfil the role of a platoon sergeant operating in the light (dismounted) role. However, the panel was unable to determine if they were trained, in accordance with AVSOs, to operate from Warrior as a dismount soldier.

Combat Medical Technician (CMT)

1.4.270. The CMT who attended the casualty came from the armoured squadron (the 5 RIFLES Bulldog ambulance had mechanical issues that delayed the D Company CMT's arrival – see sections 5 and 6).

1.4.271. The CMT joined the Army in 2016. They qualified as a class 1 CMT in 2018 and completed a Battlefield Advanced Trauma Life Support (BATLS) course in 2022. These qualifications exceeded those required to support a blank-firing exercise. Witness 15

1.4.272. The panel concluded that the CMT was suitability qualified and experienced to fulfil the role, and this was **not a factor**.

Section 4 - Infrastructure / place

General

1.4.273. This section examines the location where the accident occurred (SPTA). It seeks to determine if it was a 'safe place'. It will also determine if there were any associated factors, including environmental factors such as the weather conditions, that may have contributed to the accident.

1.4.274. **Definitions**. JSP 375 and Pam 21 defined the term 'safe place' as follows: Exhibit 39 Exhibit 43 Exhibit 123

a. **JSP 375**. 'Safe Place. This is the space to be occupied by the military for the conduct of their activities and includes any surrounding areas together with any military or civilian population which might be affected by those activities. The Safe Place should form part of the activity specific Risk Assessment taking into account the proposed use of the space and controls put in place.'[86]

b. **Pam 21**. 'Ranges, live firing tactical training areas and training areas are properly prescribed, clearly marked and conformed to the design and safety criteria given in Defence Safety Authority, Ordnance Munitions and Explosives, Part 3, including a regulated inspection programme.'[87]

Infrastructure / place - executive summary

1.4.275. Salisbury Plain Training Area (SPTA) catered for large-scale armoured manoeuvre exercises involving dismounted troops. The panel judged it to be a 'safe place' for the type of training being undertaken, and that it did not contribute to the accident. Whilst the outcome in this case was a tragic one, the response of the exercise staff and emergency services, demonstrated that even when operating remotely on Salisbury Plain the casualty was rapidly assessed and received the appropriate attention without delay. This is a testament to the emergency procedures as outlined in the SPTA Range Standing Orders and the exercise staff's knowledge and adherence of those orders.

Salisbury Plain Training Area (SPTA)

1.4.276. SPTA was the largest and busiest training area in the UK, and the only one that enabled large scale armoured manoeuvre. HQ SPTA was the Range Administering Unit (RAU) for SPTA and was responsible for the delivery of safe range facilities. HQ SPTA was controlled by the Defence Infrastructure Organisation (DIO) Overseas & Training HQ SW Region for all policy and operational matters. HQ SPTA was based out of Westdown Camp, within the bounds of the area. The training area was sub-divided into Exhibit 12

[86] JSP 375: Management of Health and Safety in Defence. Volume 1, chapter 40, page 2, paragraph 4.c.
[87] Pam 21 (2022). Page 1-3, paragraph 1-08.

smaller areas to allow the booking of separate training facilities. Alternatively, the area could be booked and used as a whole for larger training events.

1.4.277. The RATD was a regular user of SPTA due to its proximity and its suitability to train students undergoing training with AVs.

Inspection regime

1.4.278. The inspection regime for SPTA live firing areas consisted of an extensive and comprehensive inspection process that was in place to ensure all live firing facilities were safe to use. Exhibit 12

1.4.279. In order to satisfy that SPTA 'dry training' areas were safe to use, HQ SPTA relied on the constant presence of the training safety marshals, who transited SPTA daily, to highlight any facilities or areas that may have been an issue for concern or warranted further investigation. Witness 46

SPTA Range Standing Orders (RSOs)

1.4.280. Analysis of SPTA RSOs and its corresponding documentation is covered in the information section.

Recce

1.4.281. Pam 21 and SPTA RSOs stated that training deliverers were to conduct recces of the training areas that they were planning to use. SPTA RSOs had a table to assist with the recce process (see table 1.4.3). Exhibit 12 Exhibit 43

Recce Procedure		
	Dry Training Area (a)	Training Camps (b)
1.	Must be current with the SPTA unit brief (within the last 2yrs)	Must be current with the SPTA unit brief (within the last 2yrs)
2.	Must be fully conversant with the relevant Range Standing Orders.	Must be fully conversant with the relevant Range Standing Orders.
3.	Must have seen "Plain Sense" film within last 2yrs	Must have seen "Plain Sense" film within last 2yrs
4.	Agree recce with TSO (Dry) / STSM – if necessary the relevant TSM will be informed	The unit must liaise with the relevant Camp Supervisor (details at RSO Pt 1, Chap 1, Annex A)
5.	Confirm access to the recce area (it may not be accessible) prior to reporting to the SPTA Ops Room (01980 67 4951).	Must identify if a Statement Of Known Hazards is required (ground penetration).
6.	Obtain an up to date Daily Range Summary and up to date training area maps from Unit Briefing Room.	
7.	Book onto the training area through the Ops Room	
8.	If necessary, Ops Room to inform the TSM	
9.	Book off the training area through the Ops Room (01980 67 4951).	
10.	During the recce users should decide if they can only train without any temporary pennings on their allocated area.	
11.	Calculate how many fire risk assessments need to be conducted.	

Table 1.4.3 – SPTA recce procedure

1.4.282. It was stated in paragraph 11 of the Ex CS EASP that exercise staff conducted a recce of the training area on the 8 February 2022. Exhibit 7

Accident site analysis

1.4.283. The general area surrounding the site of accident was bordered by the A345 road to the east and the A338 to the west. The area was of open rural countryside interlaced by non-metal tracks, small woods were interspersed throughout the immediate area.

1.4.284. The accident location consisted of three small wood blocks approximately 100m to 150m wide surrounded and intersected by a number of dirt tracks. The wood blocks were of deciduous trees providing visibility of approximately 50m into the wood. The accident occurred on the south-eastern side of the west wood block.

1.4.285. SPTA was a well administered training facility. It had a comprehensive set of RSOs, which included appropriate risk assessments. Routines were in place to ensure users understood the risks associated with using the training area and the control measures required to mitigate them. The area was ideal for AV tactical exercises and presented no undue risks to those exercising or to the public. The RATD staff were familiar with the exercise area and the necessary routines and measures stipulated in SPTA RSOs, which they complied with.

1.4.286. The panel concluded SPTA was a 'safe place' for the purpose for which it was being used during Ex CS and this was **not a factor**.

Weather conditions

1.4.287. The meteorological conditions at 10:00 on the day of the accident were:[88] Exhibit 132

a. Temperature - 15.9°C.

b. Relative humidity - 73.2%.

c. Mean wind speed - 2 knots (easterly).

d. Visibility - 2,700 decametres (27km).

e. First light - 04:52.

f. Last light - 09:25.

g. Weather - Dry.

1.4.288. Initially on the day of the accident there was a mist which cleared early (by 09:00). At the time of the accident, it was dry, warm and visibility was good. Exhibit 132

1.4.289. Although no extremes of heat were experienced by exercising troops on the morning of the accident, the heat over the previous days had consistently reached over 20°C and as such, the risk of fires on the training area and potential for heat illness had increased. These risks had been identified in the Ex CS EASP and suitable control measures were in place. Exhibit 7

1.4.290. The panel concluded that the weather conditions were **not a factor**.

[88] Weather conditions were taken at Larkhill (approximately 9km from the accident site) and were supplied by the Met Office. First and last light timings were taken from https://www.timeanddate.com/sun/uk/salisbury?month=6&year-2022, (viewed on 15 March 2023).

Section 5 - Equipment / logistics

General

1.4.291. 'Safe equipment' was defined in JSP 375 as: 'equipment brought formally into service together with the associated documentation and underpinned by a Safety Case to ensure its safe use by a competent person. Where no Safety Case exists, any equipment hazards should form part of the activity specific Risk Assessment.'[89] Exhibit 39

1.4.292. This section focuses on the FV511 involved in the accident (C/S 42A), and the personal equipment worn by 2Lt George. It examines if the equipment involved during the accident was used within its safe operating envelope as determined by the safety case[90] and if the safety cases demonstrated risks to life were ALARP. The equipment and logistical support were also reviewed to determine if the equipment was correctly maintained. Exhibit 39

Equipment / logistics - executive summary

1.4.293. The focus of the equipment section centred on the Warrior FV511 involved in the accident (C/S 42A). An inspection carried out under DAIB supervision after the accident highlighted 24 faults that would have classified the vehicle 'non-taskworthy'. However, none of these faults contributed to the accident. One fault that did contribute to the accident was a non-functioning rear door alarm that had been identified on this vehicle in 2018 and never rectified. Had it been rectified, the panel are of the opinion it is almost certain that the accident would not have occurred. The rear door alarm was retrofitted to the Warrior fleet of vehicles following similar fatal accidents dating back to 1998. However, an effective maintenance regime had not been introduced to ensure that it functioned as intended. The situation was exacerbated by the misemployment of the FV511 as a platoon vehicle, and not as a command vehicle as per its intended use outlined in its concept of use, a key component of the vehicle's safety case. At the heart of this was a flawed safety case and ignorance of the parameters of the safe operating envelope of the equipment that they were operating.

Definitions[91]

1.4.294. **Joint Asset Management Engineering Solutions (JAMES).** JAMES was a management information system. It allowed the full management of maintenance, repair, modification and overhaul for equipment through life and provided the means to electronically store key Exhibit 127

[89] JSP 375 Volume 1. Chapter 40, page 2, paragraph 4.b.
[90] JSP 375 Volume 1. Chapter 40, page 3, paragraph 9. Safety Case - A structured argument, supported by a body of evidence that provides a compelling, comprehensible and valid case that a system is safe for a given application in a given operating environment.
[91] JAMES SOP 07 Edition 2.1.

equipment records along with the capacity to produce automated reports and returns.

1.4.295. **Equipment states**. JAMES identified three equipment states:

a. **Fully fit**. 'The equipment has no identified or recorded faults that affect its safe and legal operation or its full operational capability. It may have minor faults or cosmetic defects. Fully-Fit equipment can be used to conduct any task within the limitations of the equipment's Safety Case and the equipments Technical Support Publication.'[92]

b. **Non-taskworthy**. 'The equipment has identified or recorded faults that make it either unsafe or illegal to operate, or it is overdue certain maintenance tasks. In the case of a vehicle it is not to be used unless it is being moved to a maintenance facility and has passed a road worthiness inspection conducted by an authorised maintainer enabling it to do so. Non-Taskworthy will apply when one or more of the following conditions occur:

(1) The equipment is overdue its scheduled mandatory annual or six-monthly safety inspection.

(2) The equipment has a safety critical fault identified during scheduled inspection or maintenance.

(3) The equipment has an outstanding safety critical modification.

(4) The equipment is overdue time / usage maintenance or out of phase maintenance.

(5) There is a prohibition notice in force (VOSA or MOD as a consequence of MEI).'[93]

c. **Limited role**. 'The equipment has identified or recorded faults that affect its full operational capability but NOT its safe or legal operation. Limited Role equipment must not be used for a task which falls within its role restriction. Role restrictions must be fully understood by both those authorising the equipment for use and the equipment user.'[94]

1.4.296. **Mandatory equipment inspection (MEI)**. 'The MEI is the mandatory inspection of equipment (Less manned aircraft) carried out by unit personnel and REME tradesmen in accordance with inspection policies laid down in AESPs or technical policy directives. The responsibility for ensuring that they are completed on time rests with unit commanders. Unit commanders must be aware that there may be legal Implications if any

[92] JAMES Standard Operating Procedure (SOP), SOP 7 Glossary of Acronyms. Page 11.
[93] JAMES Standard Operating Procedure (SOP), SOP 7 Glossary of Acronyms. Page 18.
[94] JAMES Standard Operating Procedure (SOP), SOP 7 Glossary of Acronyms. Page 15.

equipment is used if it has not had a valid inspection within the prescribed time interval.'[95]

Warrior overview

1.4.297. The Warrior infantry fighting vehicle[96] (Warrior) was a family of AV used to support the armoured infantry capability across the spectrum of conflict. Warrior entered service in 1986 enabling the armoured infantry to manoeuvre in the battle space in close support of armour,[97] deliver dismounted infantry on to a defended enemy position, fight in intimate support of the dismounted infantry and extract them on completion of the mission. Warrior had been in almost continuous operational service since 1990. Exhibit 3

1.4.298. It was operated by several Army users for combat,[98] combat support (CS)[99] and combat service support (CSS).[100] The Warrior family had several variants: section (FV510),[101] command (FV511), repair (FV512), recovery (FV513) observation post vehicle (FV514) and battery command (FV515).[102] Exhibit 3

FV510 and FV511 – common features

1.4.299. The FV510 and FV511 had a dedicated crew of three: a commander, a gunner and a driver. The common aspects of these variants were (see figure 1.4.13): Exhibit 129

a. **Hull**. The vehicles were built around a hull of welded construction in aluminium alloy armour plate. The basic shape was similar for all variants with detailed changes to suit each role. The base weight was 24.03 tonnes, which increased to a battle weight of 29.4 tonnes when fitted with special armour.[103] The main engine was an integral part of the vehicle power pack which also incorporated a transmission unit and cooling system components. Contained within the transmission unit was a fully automatic gearbox, brakes and a hydrostatic steering unit. The gearbox gave four forward and two reverse speeds, manually selectable by the driver who operated from the front of the hull in the driver's compartment.

b. **Turret**. FV510s and FV511s were fitted with a steel turret, from where the commander and gunner operated.

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[95] JAMES Standard Operating Procedure (SOP), SOP 7 Glossary of Acronyms. Page 16.
[96] There are several terms used for describing Warrior. They include infantry fighting vehicle (IFV), armoured fighting vehicle (AFV), armoured vehicle (AV) and combat vehicle (tracked).
[97] Armour refers to those forces that use main battle tanks. A UK armoured regiment had three 'sabre' squadrons, each with 14 Challenger 2 (CR2) main battle tanks.
[98] Combat – Forces that engage the enemy directly (such as armoured infantry).
[99] CS – Forces that provide operational assistance including fire and manoeuvre support (artillery and engineers).
[100] CSS – Those forces that provide organisational support (such as REME equipment support).
[101] The FV510 is also referred to, colloquially and in other references, as a platoon, fighting and personnel variant.
[102] A number of FV515 were converted to ambulance variants for Op HERRICK (Afghanistan).
[103] AESP 2350-T-200-111. Annex A, table 1.

c. **Armament**. The turret was equipped with a 30mm Rarden cannon, 7.62mm Hughes Chain Gun (HCG), and two 4-barrel smoke dischargers.

d. **Optics**. To enhance situational awareness whilst operating from within the turret (closed down) there were seven fixed periscopes installed providing vision around the vehicle. FV510s and FV511s could be fitted with either the Raven sighting system or a Battle Group Thermal Imaging System (BGTI). Raven provided two periscopic sights linked to the main armament, individually controllable, they could be used for day or night vision and were equipped with selectable air defence or main armament sighting graticules. BGTI provided surveillance, weapon targeting, and navigation facilities through the provision of direct optical vision, camera, and thermal imaging along with a laser range finding capability.

e. **Section working compartment**. The section working compartment was in the rear of the vehicles for the carriage of additional personnel. It was accessible via the turret or through the rear door opening. An intercom (IC) system enabled the crew and those in the section working compartment to communicate with each other (via a headset). There was also a loudspeaker providing an alternative briefing facility. Personal equipment was stowed in internal and external storage areas. There were weapon stowage racks for the crew, but not for those in the section working compartment.

f. **Tracks**. The vehicle was supported on each side by six pairs of road wheels, with independent torsion bar suspension and hydraulic damping. Rubber-padded tracks ran under the road wheels drawn by sprockets over supporting rollers and idler wheels. Warrior had a maximum road speed of 75kph.

Figure 1.4.13 – Warrior common features

g. **Driver's instrument panel (DIP)**. The DIP provided essential vehicle information to the driver, including a rear door lamp that would indicate if the rear door was open (see figure 1.4.14). The rear door lamp worked in parallel to a two-tone audio alarm that would sound if a driving gear was selected when the rear doors were open.

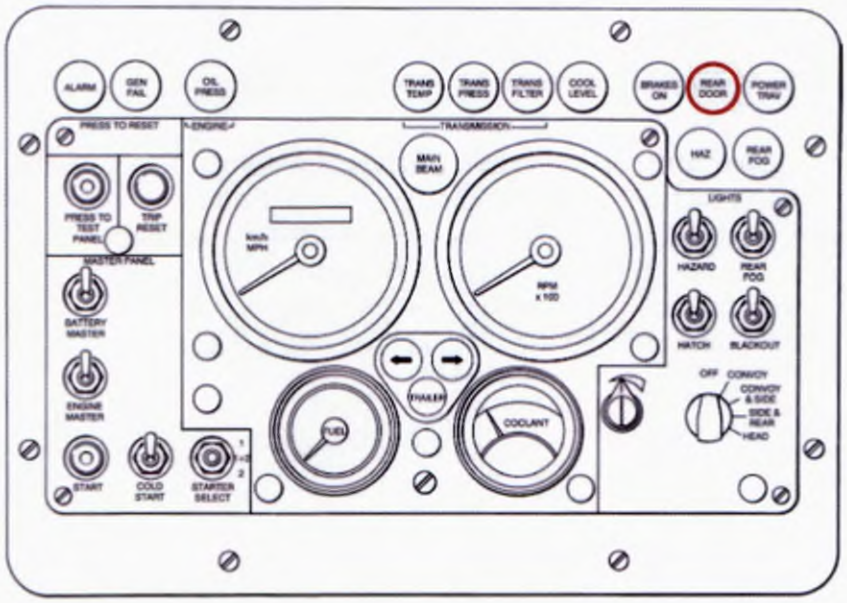


Figure 1.4.14 – Warrior driver's instrument panel (DIP)

FV510 specific features

1.4.300. The FV510's use as defined by the Warrior CONUSE, was to provide the section and platoon vehicles in armoured infantry rifle companies and anti-tank platoons. Features with notable differences to the FV511 were: Exhibit 3

a. **Section working compartment seating**. Seven inward facing seats were fitted in the section working compartment, each seat was fitted with a full safety harness. There were two double seats mounted to the compartment right wall with one double and one single seat mounted to the left wall see figure 1.4.15). Exhibit 58

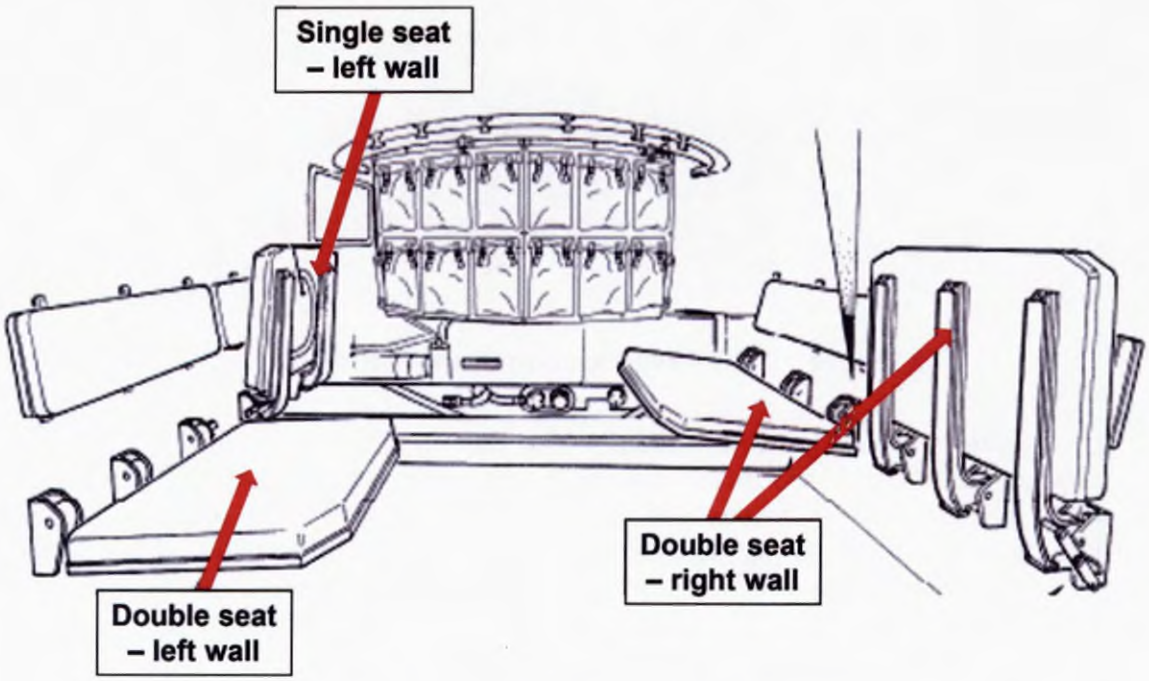


Figure 1.4.15 – Warrior FV510 rear seating

b. **Section working compartment exterior vision**. Two periscopes were fitted on the hull roof behind the turret. Each periscope could be rotated through 360° which provided surveillance of the outside area not obscured by the turret structure. There was also a vision block mounted in the rear door which enabled occupants to view the area behind the vehicle (see figure 1.4.16). Exhibit 58

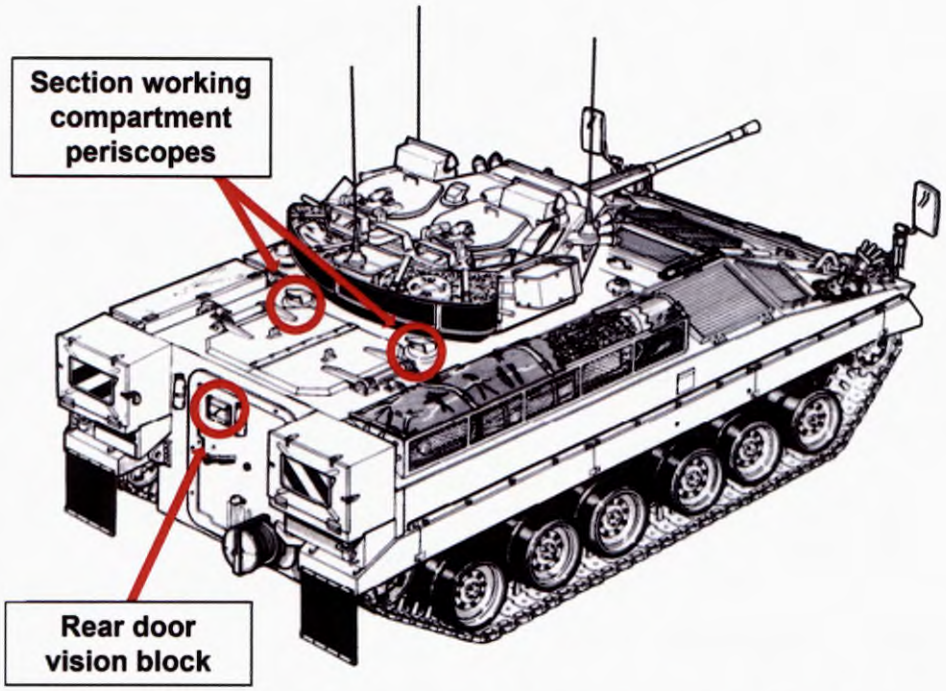


Figure 1.4.16 – FV510 section working compartment periscopes

c. **Section working compartment access**. The section working compartment in the FV510 was accessed through a single rear door that was power operated and could be opened and closed remotely by the driver, personnel in the section working compartment or from the outside of the rear of the vehicle. In addition to the rear door lamp and alarm, there was also a 'door clear' switch on the outside rear of the FV510 (see figure 1.4.17). This provided additional indication to the driver, in the form of a separate light in the driver's compartment, on the status of the dismounts when used as part of the FV510 debussing procedure. Exhibit 58

Figure 1.4.17 – FV510 'door clear' switch

FV511 specific features

1.4.301. The FV511's use as defined by the Warrior CONUSE, was to provide the command vehicles in armoured infantry battalions to the commanding officer, company commander, company 2ICs and commanders in anti-tank platoons. To facilitate this, the FV511 had architecture to fit a complex radio system in the section working compartment. Features with notable differences to the FV510 were: Exhibit 3

a. **Section working compartment seating**. There were five single seats fitted in the section working compartment. Two front facing seats mounted to the compartment rear wall (next to the rear doors – see figure 1.4.18), two inward facing seats mounted to the right wall and a rear facing seat mounted to the rear of the driver's tunnel. The two inward facing seats were fitted with lap strap harnesses, the other three seats were provided with inertia type shoulder and lap strap harnesses. Exhibit 59

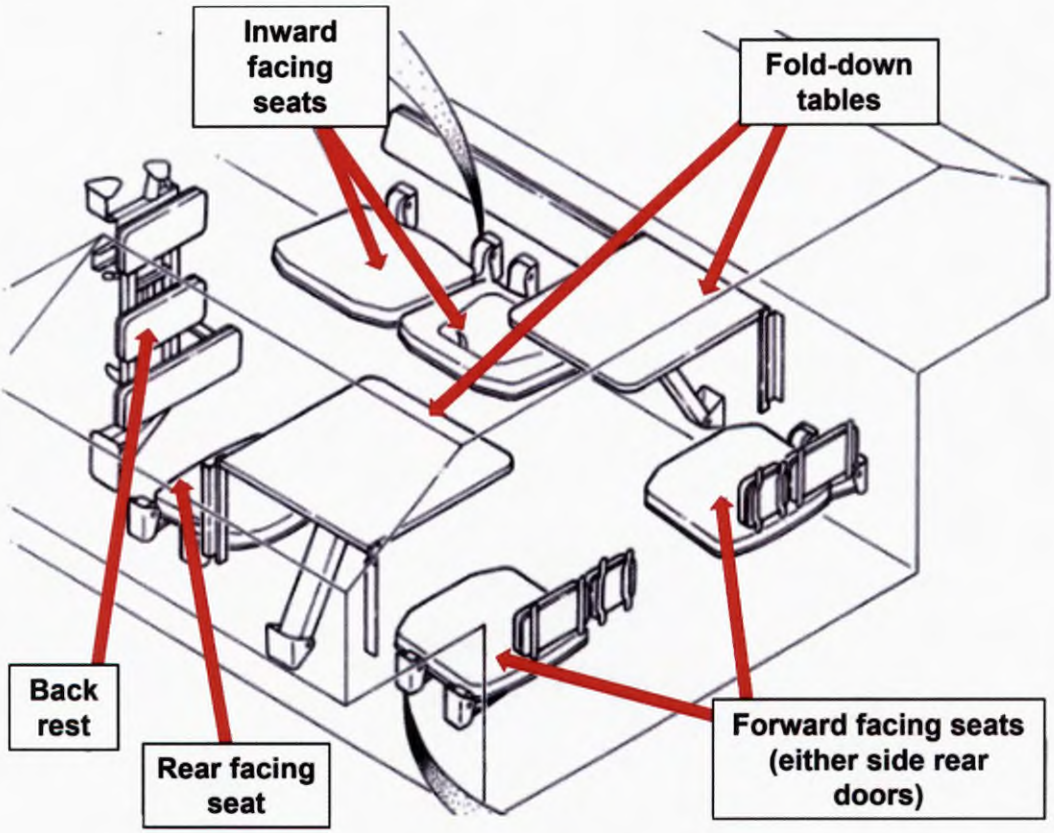


Figure 1.4.18 – Warrior FV511 rear seating

b. **Section working compartment exterior vision**. Two vision blocks mounted in the rear hull plate of the vehicle enabled occupants to view the area behind the vehicle (see figure 1.4.19). There were no periscopes mounted in the roof of the hull. Exhibit 59

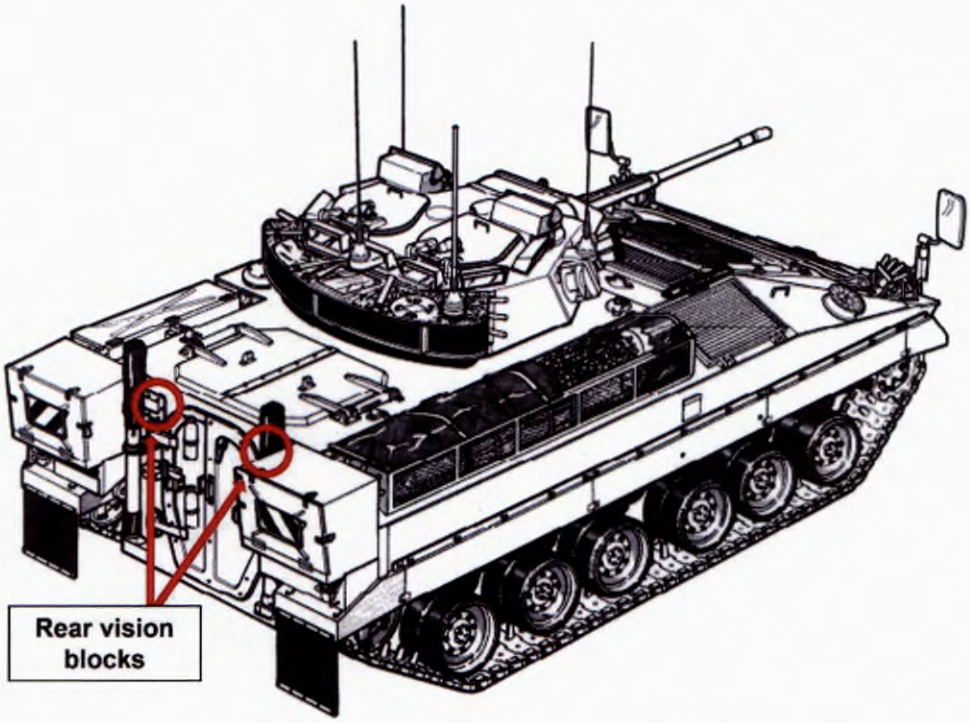
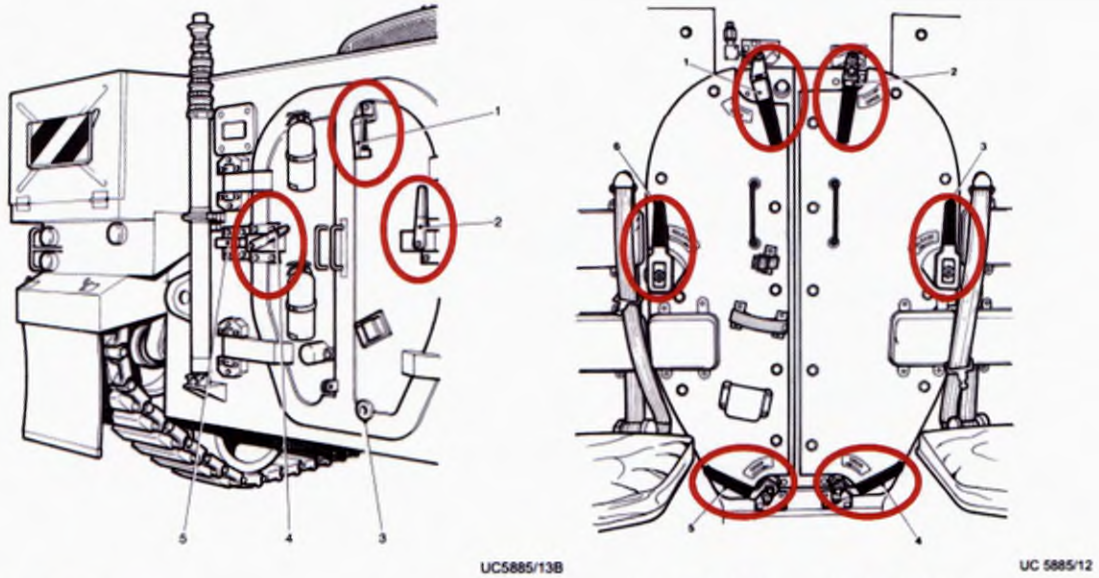


Figure 1.4.19 – FV511 rear vision blocks

c. **Section working compartment access**. The section working compartment was accessed through manual double doors at the rear of the vehicle which were opened, closed and locked using a combination of nine handles (six internal, and three external), see figure 1.4.20). Each door weighed approximately 142kg. | Exhibit 59



1 Upper latch
2 Stay release handle RH
3 Bottom clip
4 Stay release handle (LH)
5 Locking stay

1 Upper latch (r.h.)
2 Upper latch (l.h.)
3 Stay release handle (l.h.)
4 Lower latch (l.h.)
5 Lower latch (r.h.)
6 Stay release handle (r.h.)

Figure 1.4.20 – Warrior FV511 rear door handles

FV510 and FV511 comparison

1.4.302. At the time of the accident due to a lack of vehicle availability, an FV511 was being used as the platoon commander's vehicle instead of an FV510. This section analyses the key differences between the variants (shown in figure 1.4.21) to determine whether the use of an FV511 made the accident more likely to occur. Exhibit 58 Exhibit 59

1. **Door clear switch**
   a. FV510 – Yes
   b. FV511 – No
2. **Rear doors**
   a. FV510 – Single / powered
   b. FV511 – Double / manual
3. **Section working compartment - visibility**
   a. FV510 – 2 x periscopes
   b. FV511 – No periscopes
4. **Section working compartment – seats**
   a. FV510 – Unobstructed
   b. FV511 – Inward facing / obstructed
5. **Rear door opening**
   a. FV510 – Wide
   b. FV511 – Narrow

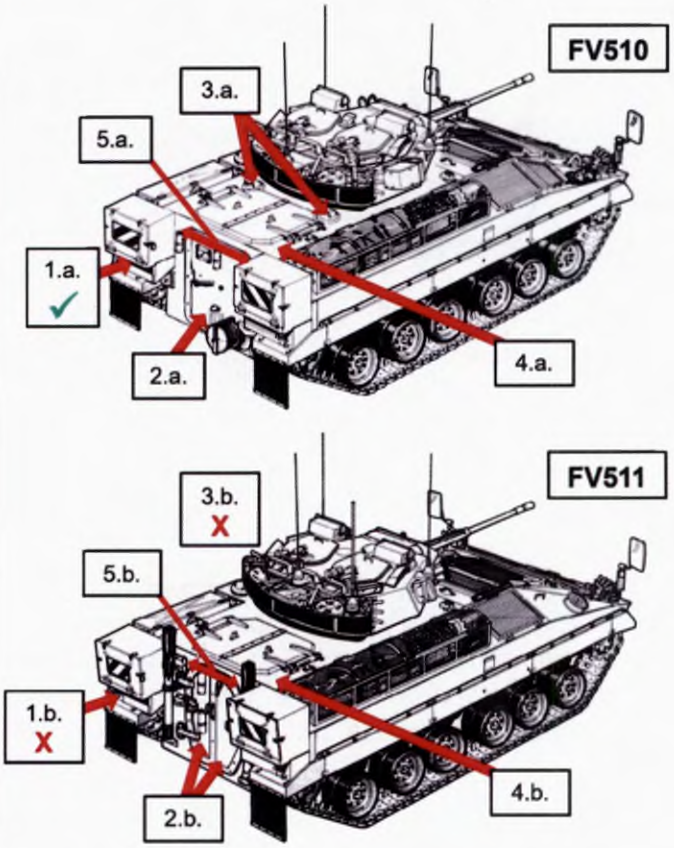


Figure 1.4.21 – FV510 and FV511 comparison

a. **Door clear switch**. The FV510 had a 'door clear' switch. This was pressed by those exiting (debussing) the FV510 to indicate to the driver via a light in the driver's compartment, that personnel had exited the vehicle and the door was clear and safe to close. The FV511 did not have a door clear switch and there was no method to inform the driver that personnel had exited the vehicle.

b. **Rear doors**. The Armoured Trials and Development Unit (ATDU) conducted a trial in support of the service inquiry to determine the differences between debussing from an FV510 (which those involved in the accident were familiar with) and from an FV511 (which they were less familiar with). The following observations were made during the trial.

(1) **FV510 powered rear door**. The rear single powered door on the FV510 was opened remotely by the driver. This allowed

for personnel to exit the FV510 without having the added burden of operating the door themselves. This allowed them to exit the vehicle and immediately move clear. The 'door clear' switch was operated by the debussing troops to indicate they had exited the vehicle, and the commander would only give the order for the door to be closed once this had been pressed and the driver had reported 'door clear', or if they had received a thumbs up signal from the debussing troops. The driver then closed the door and only when the driver reported that the door was closed would the commander then give the order to move. This multi-layered approach was in stark contrast to the FV511 which wholly relied on the commander getting a visual confirmation from the personnel who had debussed. This (as examined in section 6) was extremely difficult due to the commander's restricted visibility when operating 'closed down'.

(2) **FV511 manual rear doors**. The manual rear doors on the FV511 proved cumbersome to open, especially to those unfamiliar with their operation. This was in part due to there being a total of nine handles, which required two hands to operate. Initial attempts during the ATDU trial took one of the FV511 crew members over two minutes to open and close the doors. Unlike the FV510, the exiting person was also required to close the doors and, therefore, was unable to immediately move clear. There was no 'door clear' switch on an FV511, which made it difficult for the dismounts to inform the crew that they had exited the vehicle.

(3) **Rear door open lamp**. Ordinarily in both these variants a 'door open' lamp indicated on the DIP if the rear doors were open. This was an amber light and was situated on the top right-hand side of the DIP, which was partially obscured by the steering control. This was not working on C/S 42A. Therefore, it could not be used to confirm if the rear doors had been closed or not when 2Lt George was debussing from the vehicle.

c. **Section working compartment – situational awareness**. The rotatable periscopes in the roof of the FV510 hull provided enhanced situational awareness to the occupants of the section working compartment, compared to those in an FV511 who only had two viewing blocks to see outside. Therefore, those debussing from an FV510 were more likely to have better situational awareness which would have aided them during their exit from the vehicle.

d. **Section working compartment – seat arrangements**. The bench arrangement of the seats in the FV510 provided a clearer route to exit the vehicle. The section working compartment in the FV511 was more cluttered with tables and map boards, and also had some seats facing forwards, which was in the opposite direction of travel for those exiting the vehicle. The panel assessed these

features made it more intuitive and easier to exit the FV510 than the FV511.

e. **Rear door opening**. The rear door opening dimensions on the FV510, were wider than that of an FV511 (see figures 1.4.22 and 1.4.23). The smaller dimensions on the FV511 would, more likely than not, restrict the egress of personnel.

Figure 1.4.22 – FV511 rear door opening dimensions

Figure 1.4.23 – FV510 rear door opening dimensions

1.4.303. The panel concluded that the FV511 was not optimised for debussing armoured infantry platoon personnel due to its manual rear doors, forward facing seats, narrow rear door opening, lack of a 'door clear' switch, and lack of prescribed debussing procedure. The panel finds the use of an FV511 as a platoon vehicle was a **contributory factor**.

1.4.304. **Recommendations have already been made at paragraphs 1.4.21 to 1.4.23 that front line commands should ensure that formal debussing procedures are incorporated into the operating instructions for those in-service passenger carrying armoured vehicles (AV) that they are responsible for, to ensure there is safe system of work in place for troops to debus safely from AV.**

1.4.305. **Recommendation. Director Land Equipment should, where practicable, ensure that technical devices are fitted to all armoured vehicles that are capable of carrying passengers, to allow passengers to indicate they have exited the vehicle.**

1.4.306. **Recommendation. Chief of Staff Field Army should ensure armoured vehicles used by the Field Army are only used within their safe operating envelopes as defined by their safety cases. This is to comply with the safe system of work and to ensure safety risks are as low as reasonably practicable (ALARP) and tolerable.**

1.4.307. **Recommendation. Deputy Assistant Chief of Staff Littoral Strike should ensure armoured vehicles used by the Navy, are only used within their safe operating envelopes as defined by their safety cases. This is to comply with the safe system of work and to ensure safety risks are as low as reasonably practicable (ALARP) and tolerable.**

1.4.308. **Recommendation. Air and Space Commander should ensure armoured vehicles used by the RAF, are only used within their safe operating envelopes as defined by their safety cases. This is to comply with the safe system of work and to ensure safety risks are as low as reasonably practicable (ALARP) and tolerable.**

1.4.309. **Recommendation. Deputy Commander Strategic Command should ensure armoured vehicles used by Strategic Command, are only used within their safe operating envelopes as defined by their safety cases. This is to comply with the safe system of work and to ensure safety risks are as low as reasonably practicable (ALARP) and tolerable.**

Warrior safety case

1.4.310. A safety case was defined in JSP 375 as 'a structured argument, supported by a body of evidence that provided a compelling, comprehensible and valid case that a system is safe for a given application in a given operating environment.'[104] This section reviews the relevant components of the safety case, its management and the argument it made to determine if it was valid in making the case that Warrior was safe for its intended use. Exhibit 39

CONUSE

1.4.311. The Warrior CONUSE was a fundamental part of the safety case. It described the intended use and the context for its employment. This formed the basis on which the risks associated with the equipment were to be assessed, to determine if they were ALARP and tolerable. Exhibit 3

1.4.312. The latest version of the Warrior CONUSE was dated 2 March 2015. The information contained within the CONUSE was relevant and clearly stated the intended use of each of the Warrior variants, with the FV510 as a platoon vehicle and the FV511 as a command vehicle. The Warrior safety case was predicated on these intended uses of these variants.

1.4.313. In this instance, the FV511s were being used as platoon vehicles. This was not in line with their intended use as defined in the CONUSE. It stated in the Safety and Environmental Case Summary Report (SECSR) Exhibit 50

[104] JSP 375 Volume 1. Chapter 40, page 3, paragraph 9.

that, 'Any deviation from a platforms safe operating envelope is managed in accordance with the Operational Dispensation'. The panel was not presented with any evidence to show there was dispensation in place to use the FV511s in this manner. In the panel's opinion, its use in this manner fell outside of the safe operating envelope as defined by the safety case.

1.4.314. The panel concluded that at the time of the accident, the FV511, (C/S 42A) was not being used in line with its intended use as defined by the CONUSE which the safety case was predicated on. Therefore the activity fell outside of the safe system of work, safety assumptions were not met, and safety risks were not ALARP or tolerable. The panel finds the use of the FV511 variant in this instance, contrary to that predicated in the Warrior CONUSE, was a **contributory factor**.

1.4.315. **Recommendations have already been made at paragraphs 1.4.306 to 1.4.309, that front line commands should ensure armoured vehicles are only used within their safe operating envelopes as defined by their safety cases. This is to comply with the safe system of work and to ensure safety risks are as low as reasonably practicable (ALARP) and tolerable.**

Safety and Environmental Case Summary Report (SECSR)

1.4.316. The SECSR[105] provided a structured summary of the Warrior in-service safety and environmental case (safety case) that was used to justify the safety claims and to demonstrate that the achieved levels of environmental safety performance, were ALARP and tolerable. It communicated how the safety case complied with MOD policy and was reviewed annually by the in-service Warrior platform safety and environmental panel (SEP). Exhibit 50 Exhibit 113

1.4.317. Policy dictated that the SCR (SECSR) was to be re-signed after each update and not less than every three years.[106] The Warrior platform SECSR was issued in December 2019 and was valid at the time of the accident. Exhibit 131

1.4.318. The SECSR was 'accepted by the MOD', but was missing three 'wet' signatures, the Vehicle Support Team (VST) Safety Engineering Manager, the VST Senior Operations Manager and the empowered representative from HoC GM (capability sponsor). This was due to members of the SEP being unable to physically sign the SECSR due to restrictions imposed by the COVID-19 Pandemic. This was explained in the minutes for the SEP meeting held on 24 February 2022.[107] Exhibit 50 Exhibit 113

[105] The SECSR was also referred to as a safety case report (SCR).
[106] Vehicle Support Team's Safety Management Plan (SMP). Page 12, paragraph 30.
[107] Minutes of in-service Warrior platform safety and environmental panel (SEP) 22.01 meeting held via Teams on 24 February 2022. Page 26.

1.4.319. On page 57 of the SECSR it stated, 'When Warrior Platforms (Core) are operated and maintained in accordance with AESP documents, Pamphlets and Tactical Aides Memoire (PAMS & TAMS), Armoured Vehicle Standing Orders (AVSO), MOD procedures and publications, and the safety assumptions are met, the safety risks are tolerable and ALARP. Furthermore, the vehicles do not expose personnel, the general public or the environment to unacceptable risk.' As evidenced in this report there were omissions from the publications. The AESP did not contain procedures for debussing from the FV511, and did not direct that a Warrior with a non-operating rear door alarm should be sentenced as non-taskworthy or limited role. Therefore, in the panel's opinion the statement in the SECSR that safety risks were, 'tolerable and ALARP' was not correct. Exhibit 50 Exhibit 59 Exhibit 113

1.4.320. The panel concluded that the Warrior platform had an in-date safety case at the time of the accident. However, due to the omissions from the AESPs regarding the sentencing of Warriors with non-functioning rear door alarms and FV511 debussing procedures, the safety risks with the Warrior platform were not ALARP or tolerable and this was a **contributory factor**.

1.4.321. **Recommendations have already been made at paragraphs 1.4.21 to 1.4.23 that front line commands should ensure that formal debussing procedures are incorporated into the operating instructions for those in-service passenger carrying armoured vehicles (AV) that they are responsible for, to ensure there is safe system of work in place for troops to debus safely from AV.**

1.4.322. **Recommendation. Director Land Equipment should ensure that, for land equipment vehicles, all safety related modifications and associated systems are subject to hazard analysis as part of the overall safety case to determine appropriate maintenance schedules and operating procedures to ensure the resulting safety risks are as low as reasonably practicable (ALARP) and tolerable.**

Warrior reversing accidents

1.4.323. Using the definitions from the MOD's Acquisition Safety & Environment Management System, safety concerns from accidents[108] and incidents[109] were fed into the risk analysis conducted by the Warrior In-Service Support team, informing the action required to reduce risks. Categorised by accidents, hazards[110] and their associated control Exhibit 136 Exhibit 155

[108] Accident. An event, or sequence of events, that causes unintended harm.
[109] Incident. The occurrence of a hazard that might have progressed to an accident, but did not.
[110] Hazard. Potential to cause harm, e.g. A physical situation or state of a system, often following from some initiating event that may lead to an accident.

measures,[111] they were captured within the Warrior hazard log held in eCassandra.[112]

1.4.324. Eight accidents were attributed to reversing Warriors between January 1998 and September 2010, of which three were fatalities. There were no accidents attributed to reversing Warriors from October 2010 until this accident. Thirteen reversing incidents were reported during the same period. Exhibit 55 Exhibit 63

1.4.325. The risk of reversing accidents led to two lines of development: the retrofitting of a rear door alarm, and the scoping of improved local situational awareness cameras.

Rear door alarm modification

1.4.326. The fatalities that occurred during the reversing related accidents in 1998 and 1999 initiated a review which led to the requirement for additional control measures. As a result, approval was gained in 2001 for rear door alarms to be retrofitted to all Warriors. The two-tone alarm sounded if the rear door was open with a driving gear selected. It was intended for the modification process to be completed by November 2002. The modification instruction (AESP 2350-T-200-811)[113] showed the fleet modification was complete by August 2013. Exhibit 64 Exhibit 65 Exhibit 66

1.4.327. No reversing accidents were reported post 2010, suggesting the modification was more likely than not the key reason for the reduction in accidents involving reversing Warriors and debussing personnel.

1.4.328. Whilst there was a regime to check if the alarm functioned (monthly during the commanders function test), there was not an explicit sentencing requirement to be placed on the vehicle if the alarm did not function when tested. This was left to the discretion of the Level 2 maintainers (REME vehicle mechanics), including any limitation on the vehicle's use. Exhibit 69

1.4.329. The panel **observed** that it was more likely than not that the retrofitting of the rear door alarm was an effective and essential safety measure that reduced reversing related accidents involving debussing troops from Warrior.

1.4.330. The panel concluded that the lack of explicit instructions to sentence a Warrior with a non-functioning rear door alarm as non-taskworthy

[111] JSP 375 Master Glossary. Page 3. Control measures. Measures that can be taken to reduce the possibility of a risk arising or to reduce the effect of any risk that arises. These measures may include, for example, alternative ways of working or personal protective equipment (PPE).
[112] A database tool utilised by DE&S for managing risk.
[113] AESP 2350-T-200-811 - Modification instructions and index. Modification Instruction No. 90.

or limited role nullified it as an effective control measure to reduce the risk of reverse related accidents. The panel finds this was a **contributory factor**.

1.4.331. **A recommendation has already been made at paragraph 1.4.322, that the Director Land Equipment should ensure that, for land equipment vehicles, all safety related modifications and associated systems are subject to hazard analysis as part of the overall safety case to determine appropriate maintenance schedules and operating procedures to ensure the resulting safety risks are as low as reasonably practicable (ALARP) and tolerable.**

Improved local situational awareness (ILSA)

1.4.332. Safety reviews following a fatality in December 2007 culminated in 2010 with a DE&S sponsored cost benefit analysis (CBA) to improve situational awareness for Warrior drivers. The CBA took the results of previous semi-quantitative safety analyses conducted for Warrior road traffic accident scenarios and combined them to give an aggregated individual risk posed to Warrior occupants due to overturning, flooding, and key to this inquiry, reversing accidents. The CBA covered a package of modifications including the installation of a rear camera (but not as a standalone modification). Exhibit 68

1.4.333. The CBA concluded that the cost of introducing ILSA would be grossly disproportionate to the safety benefit gained. Subsequently ILSA, including the rear camera was not approved or embodied onto the Warrior core equipment.

1.4.334. The package was, however, embodied into the operational equipment standard (OES) as part of a limited fitment to Warrior for deployed operations. The vehicle involved in the accident did not have this suite of modifications, and the panel did not assess whether a rear camera would have been an effective barrier for preventing this accident.

1.4.335. The panel **observed** that with a functioning rear door alarm and with fully trained personnel using prescribed debussing procedures, the risk of an accident occurring whilst debussing would have been very unlikely. Based on the CBA, the assessment not to fit cameras was considered correct at the time due to the grossly disproportionate costs, and a camera, whilst desirable, was not essential to ensure the risk was ALARP and tolerable.

Warrior safety notices

1.4.336. Several 'safety notices via e-mail' (SNvE)[114] relating to Warrior had been issued that were valid at the time of the accident. They required

[114] SNvEs were a method for issuing equipment safety notices using the MOD e-mail system. They were generated by either the DE&S project team or Army HQ.

certain actions to be taken to ensure the safe operation of the platform. Those that were relevant to the inquiry are examined below.

a. **SNvE 1415 - final drive**

(1) Safety concerns over the quality of the Warrior's final drive[115] internal components after unexpected failures necessitated limitations to be imposed on operating Warriors. The failure of a single final drive (there were two on each vehicle) would induce an un-demanded and potentially rapid deviation from the intended path for the vehicle. A 10m minimum clearance was introduced for all personnel in the vicinity of a Warrior that had the potential to be manoeuvring (such as manoeuvring after debussing personnel). SNvE 1415 restrictions for personnel in proximity to Warrior were applied during Ex CS. — Exhibit 7, Exhibit 67

(2) This necessitated those personnel debussing from Warrior to move at least 10m away from the vehicle, before the vehicle could then move. In some circumstances, such as when operating in wooded areas, this could have made it more difficult for the Warrior commander to see the dismounts once they had exited the vehicle.

b. **SNvE 1429 - noise**

(1) Monitoring of armoured vehicle operator exposure to noise led to the implementation of restrictions on the amount of time personnel could operate within Warrior vehicles. The change limited not only in-vehicle time for crews and dismounts, but reduced maximum speed on and off road, and had associated personal protective equipment (PPE) use restrictions. — Exhibit 8

(2) SNvE 1429 reduced the amount of time personnel could train in Warrior, which is likely to have had an impact on their competency of operating with Warrior. — Witness 33, Witness 37

c. **SNvE 1440 - platform fixed fire extinguishers (FFE)**

(1) The design authority identified that the manually operated FFE used on Warrior had a five-year life span for internal components and seals, and most extinguishers had passed that date or were approaching it. This created a potential safety issue. SNvE 1440 came into effect 25 May 22 to address the issue. — Exhibit 84

[115] The final drive is the gearing between the transmission and the driven wheels.

(2) The SNvE necessitated users to undertake a number of additional checks to ensure the affected FFEs were safe for continued use. This particularly impacted on D Company who had to reprioritise training in order to conduct these additional tasks.

1.4.337. The panel **observed** that the restrictions and measures required by the SNvEs at the time of the accident created additional challenges for the resourcing and management of equipment.

Equipment care (EC)[116] Exhibit 126

5 RIFLES - Unit Equipment Care Directive (UECD)

1.4.338. The 5 RIFLES UECD detailed how EC was to be conducted in the unit. Chapter 9 pertained to vehicles and included direction on, ownership, management, checks, tests, inspections, documentation, and fault reporting. Exhibit 70

5 RIFLES - land equipment audit (LEA)

1.4.339. An LEA, 'assesses a unit's compliance and conformance with legislative and Defence regulatory and other policy requirements; this should confirm if EC risks are being adequately managed, particularly for safety critical activities. This combination ensures Duty of Care with all facets of Health and Safety (H&S) associated with the serviceability and maintenance of equipment. During the LEA, the standards of EC and equipment serviceability are audited, including equipment maintenance'. 5 RIFLES was subject to an LEA during the period 1 to 3 November 2021. Exhibit 154

1.4.340. The LEA report found six areas of non-conformance,[117] nine observations where the unit were at risk of becoming non-conformant or non-compliant,[118] and 31 areas identified as good practice. Of the six areas of non-conformance, two were related to the management of road-going vehicles: Exhibit 85

a. Instances of non-taskworthy user identifiable faults were found that were not reported prior to the monitor checks. This non-conformity was found to be prevalent within the unit's tracked vehicles.

[116] LEUMS. Chapter 1, page 1, paragraphs 1 and 2. Equipment Care (EC) is the unit regime to ensure that planned equipment availability is achieved; a function of command, it enhances operational effectiveness. It includes the cleaning, forecasting and maintenance (including testing and inspection) by the user and supporting ES staff, to ensure the highest levels of equipment availability and that equipment is kept in an operational state. EC is the means to ensure that the people, systems, processes and resources that deliver the integrity of Land Systems are in place, in use and will perform when required throughout the equipment's lifecycle. EC includes Equipment Support (ES) Levels 1 and 2 and is a key factor in sustaining a unit's combat power; it is applicable in barracks and on deployment.

[117] Non-conformant – refers to being not conforming to MOD policy.

[118] Non-compliant – refers to be not compliant with statutory policy (i.e. breaking the law).

b. Multiple instances of overdue modifications, which were not identified on the subsequent inspections.

1.4.341. The UECD was clear in its direction for the management of AVs and the reporting of user identifiable faults. However, as the LEA identified, EC practices were not always conducted in-line with the policy and direction contained within the UECD. In the panel's opinion 5 RIFLES EC regime was challenged by conflicting requirements, whole fleet management issues, lack of resources and non-armoured infantry taskings removing crews from their armoured infantry roles which included vehicle maintenance.

1.4.342. Although there were 31 areas of good practice detailed within the LEA, evidence from DAIB's technical report on C/S 42A suggested some of the LEA's findings had not been addressed. This is based on the vehicle being sentenced as taskworthy despite having 24 faults that would have sentenced the vehicle as being non-taskworthy had they been identified, some of which were very likely to have been present when it received its MEI in March 2022. Exhibit 44

1.4.343. The panel concluded that the 5 RIFLES equipment care regime was challenged by conflicting requirements, whole fleet management, lack of resources and non-armoured infantry taskings removing crews from their vehicle maintenance duties, leading to the accident vehicle being used on Ex CS despite having multiple non-taskworthy faults that were almost certainly present during its MEI in March 2022. The panel finds that the challenges to the 5 RIFLES EC regime to be **an other factor**.

1.4.344. **Recommendation. Chief of Staff Field Army should ensure that units are appropriately resourced, and are enabled to prioritise to ensure vehicles are correctly maintained and inspected in accordance with the associated equipment support publication so they are safe to use in accordance with the safe system of work.**

FV511 (C/S 42A)

Vehicle history

1.4.345. The vehicle involved in the accident was an FV511 command variant (equipment registration mark (ERM) [redacted]) which entered service in 1988. It was part of the 5 RIFLES basic unit fleet (BUF).[119] The vehicle was transferred to 5 RIFLES on 9 February 2018 from 1st Battalion The Yorkshire Regiment. It was further transferred several times between the companies within 5 RIFLES and on two occasions externally to other units. It was transferred to D Company on 25 May 2022, 20 days prior to the start of Ex CS. Exhibit 46

[119] BUFs were permanently held by Army units and subsequently operated and maintained by the unit. BUFs were sized and shaped to deliver sub-unit (company) activity within the unit.

FV511 (C/S 42A) - mandatory equipment inspection (MEI)

1.4.346. Equipment sentencing and fail criteria were in accordance with the guidance held in the Standards and Inspection Manual 11 Tracked Vehicles (SIM 11) and Role Equipment (SIM 12). The specific inspection standards and acceptable quality levels were specified in the relevant AESPs. All Warrior variants were to receive an MEI every six months. An MEI for a Warrior consisted of two complementary and concurrent automotive inspections to prove roadworthiness and role fitness. Exhibit 106

1.4.347. An MEI was conducted on C/S 42A in March 2022.[120] 21 faults with the vehicle were recorded on JAMES, nine of which imposed a 'limited role' on the vehicle. None of the faults had imposed a restriction on its ability to carry troops in the section working compartment or that rendered the vehicle 'non-taskworthy'. Exhibit 6 Exhibit 103 Exhibit 104 Exhibit 105

Commander's function test (CFT)

1.4.348. The aim of a CFT was to enable commanders to know the general state of a vehicle with particular attention to the following aspects, safety, performance, condition and appearance. Exhibit 69

1.4.349. It was to be carried out monthly when there was not a Level 2 (REME) inspection due. It was the responsibility of the sub-unit commander to nominate a qualified crew to conduct the test. On completion of the test the results were to be recorded on JAMES and faults requiring REME action were to be reported for rectification.

1.4.350. CFTs were to be conducted on FV511s in accordance with the direction in AESP 2350-T-200-601. This included checking the operation of the rear door alarm.

1.4.351. C/S 42A received a CFT on 27 May 2022 shortly before deploying on Ex CS. Six faults were identified during the test. The fault with the rear door alarm was not recorded during this CFT, even though it was present (it had initially been identified in 2018). Exhibit 13 Exhibit 17 Witness 12

1.4.352. The Warrior commander who was responsible for overseeing the CFT identified that the alarm did not function when tested, but was informed (incorrectly) that the FV511 did not have rear door alarms. For this reason the fault was not recorded during this CFT.

1.4.353. The incorrect understanding that the FV511 did not have a rear door alarm was commonplace amongst those Warrior crews interviewed. This further highlighted the users' lack of familiarity with the FV511, its safety features and its safe operation. In this instance, even if the crew had realised

[120] The MEI was conducted in March 2022 by Inspector 1. The MEI was 'closed' and recorded on JAMES by Inspector 2 in April 2022. The delay between the MEI and recording was due to the Inspector 1 deploying abroad at short notice before they could record the MEI on JAMES.

there was a rear door alarm and it was not working, due to the lack of spare parts, the fault would not have been rectified, and, due to it previously being recorded as a 'fully fit' fault, no further restrictions would have been placed on the vehicle's use.

Authority to use document (ATUD)

1.4.354. The ATUD was generated by JAMES, issued on tasking, and authorised the use of the vehicle. The ATUD also detailed vehicle particulars, maintenance validity, intended activity, restrictions on use, and role limiting / non-taskworthy faults. The JAMES instruction (linked from the 5 RIFLES UECD) required both the driver and commander to sign the ATUD. This differed from non-armoured wheeled vehicles that only required the driver's signature. Any changes in driver or commander were also to be recorded on the ATUD. Exhibit 70 Exhibit 71

1.4.355. C/S 42A's ATUD listed eight 'limiting role' faults (of which only two had a description of the actual limitation). The fault with the rear door alarm was not listed on the ATUD. There were no commanders' signatures on the ATUD (analysis for this is covered in section 6). Exhibit 72

Vehicle checks

1.4.356. 'Before use',[121] 'during use'[122] and 'after use'[123] vehicle checks were mandated to be carried out by the driver on taking over a vehicle, at recognised breaks in the journey and on completion of the task. 5 RIFLES' UECD stated that these checks should be recorded on a form which was located in annex B to chapter 9 of the UECD. Exhibit 70 Exhibit 153

1.4.357. On the morning of 21 June 2022, Driver 1 conducted a 'before use' check on C/S 42A. However, no records of the checks could be produced for the panel (see section 6). Witness 32

Rear door faults

1.4.358. **Holding open device**

a. The FV511 rear manual doors had a holding open device that locked the doors in the open position when fully opened and prevented them from swinging shut. The holding open devices on Exhibit 44

[121] Defence Movements and Transport Policy. JSP 800, Volume 5, Part 2. Policy leaflet 41, paragraph 21.a. '**Before Use**. On taking over a vehicle the driver is to carry out checks to ensure the vehicle is roadworthy and its load is safe and secure.'
[122] Defence Movements and Transport Policy. JSP 800, Volume 5, Part 2. Policy leaflet 41, paragraph 21.b. '**During Use**. At each recognised break in the journey the driver is to examine the vehicle and its load to ensure the vehicle is still safe to operate, no faults have developed and that the load, where carried, remains safe and secure.'
[123] Defence Movements and Transport Policy. JSP 800, Volume 5, Part 2. Policy leaflet 41, paragraph 21.c. '**After Use**. After use checks shall be conducted to detect any vehicle faults which may have occurred during use and require attention before the vehicle can be used again.'

C/S 42A were faulty and prevented them from locking in the open position. The ramifications of this are assessed in section 6.

b. This was a known fault which did not have any associated limiting role.

1.4.359. **Rear door alarm and rear door open lamp**. The rear door alarm and rear door open lamp on C/S 42A did not work due to a severed cable (see figure 1.4.24). Exhibit 44

Figure 1.4.24 – Rear door switch severed cable

1.4.360. The fault had been identified in 2018 and had not been rectified at the time of the accident. The fault had not had a limiting role imposed (i.e. it was classed as a 'fully fit' fault). This was not incorrect as there was not an explicit instruction to class the fault as a limited role or non-taskworthy fault. As the fault had been classed as a 'fully fit' fault, the provision of a replacement wiring harness was given a low priority. Exhibit 87

1.4.361. No spare wiring harnesses had been in stock since 2011 and one was not made available between the fault being reported in 2018 and the accident occurring in June 2022. Accordingly, the fault was not rectified. Exhibit 140 Exhibit 162

1.4.362. The fault with the rear door alarm removed one of the key safety features that had been introduced to reduce the risk of reversing related accidents to ALARP. Since its introduction there had not been any reverse related accidents recorded which demonstrated its effectiveness as a control measure. Had the fault been classed as anything other than 'fully fit', in the panel's opinion it was almost certain C/S 42A would not have been used to carry personnel in the section working compartment and the accident would almost certainly not have occurred.

1.4.363. The panel concluded that the risks of a reversing related accident involving C/S 42A was not ALARP due to the non-functioning rear door alarm. Therefore, the vehicle could not be considered 'safe equipment', and in the panel's opinion had the alarm been working the accident would almost certainly not have occurred. The panel finds that the Warrior's non-functioning rear door alarm was a **causal factor**.

1.4.364. **A recommendation has already been made at paragraph 1.4.322, that the Director Land Equipment should ensure that, for land equipment vehicles, all safety related modifications and associated systems are subject to hazard analysis as part of the overall safety case to determine appropriate maintenance schedules and operating procedures to ensure the resulting safety risks are as low as reasonably practicable (ALARP) and tolerable.**

FV432 (Bulldog 2) ambulance

1.4.365. The Bulldog ambulance was a tracked armoured personnel carrier (APC). It was crewed by a driver and commander and had capacity for one medic and four stretchers, or one medic, two stretchers and five seated personnel. Two Bulldog ambulances supported Ex CS, one with the armoured infantry company and one with the armoured squadron. Exhibit 138

1.4.366. The Bulldog originated from the FV430 series APC which entered service in 1962. They underwent an upgrade to the 'Bulldog' specification from 2006. There were several variants of the upgraded Bulldog: FV432 (Bulldog 2), FV434 (Bulldog 4) and FV436 (Bulldog 6). The ambulance variant was based on the FV432 (Bulldog 2) (see figure 1.4.25).

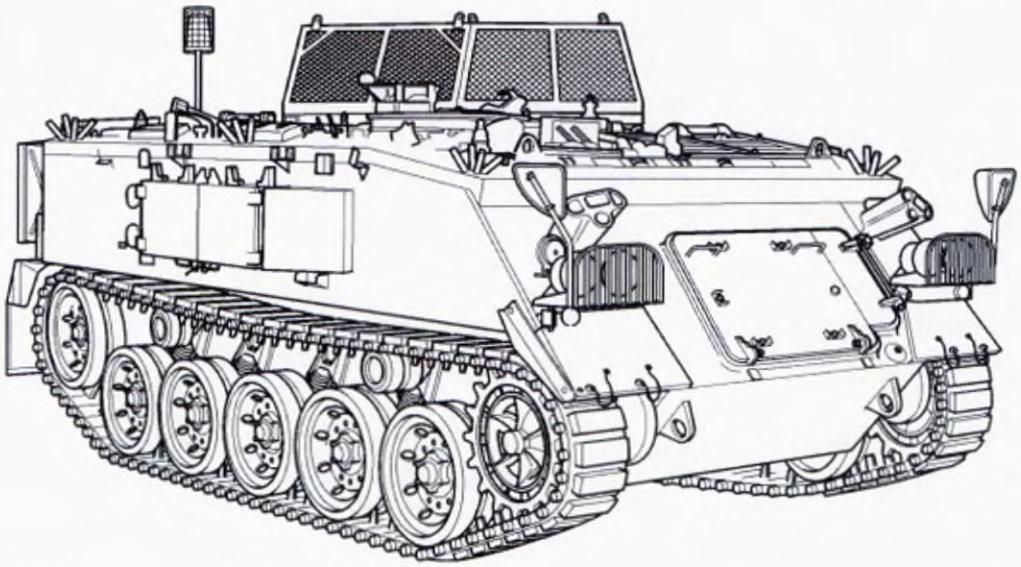


Figure 1.4.25 – Bulldog 2

1.4.367. At the time of the incident both Bulldog ambulances had technical issues that delayed their arrival at the accident location (see section 6). The armoured infantry's (5 RIFLES) Bulldog ambulance was unable to move due to a failed IC system and the crew could not communicate with each other. In accordance with AVSOs, if crews of an AV could not communicate with each other, the vehicle should not be driven. The armoured squadron's (QRH) Bulldog had a severed engine throttle control. The latter was rectified after a short period. Witness 12 Witness 17

1.4.368. This accident highlighted a reliability issue with the Bulldog ambulance. Although one was quickly repaired and arrived at the scene approximately 10 minutes after the accident, had it not, and had the casualty been in a condition where they may have benefitted from rapid intervention by a CMT, the reliability of the Bulldog ambulance could have been a factor.

1.4.369. The panel **observed** that the delayed arrival of the CMT due to serviceability issues with the Bulldog ambulances did not impact on the outcome of this accident.

Communications Information Systems (CIS)

1.4.370. Three CIS systems were used during Ex CS: Exhibit 7

a. **Bowman**. Bowman radios provided the tactical communications for use between the exercising troops. The exercise staff also used Bowman to give instructions to exercising troops when required. The Bulldog ambulances were also fitted with Bowman radios.

b. **Airwave Network**. The Airwave Network was used to provide a dedicated exercise safety and command communications for use by the exercise staff, medical support and sub-unit commanders.

c. **Mobile phones**. A mobile phone was used by the exercise staff to call the emergency services.

Bowman

1.4.371. Bowman was a UK military tactical CIS. It provided a range of radios including portable, vehicle, airborne and ship mounted sets, that provided a fully secure voice service on HF and VHF radio nets down to section level. The Bowman system also provided secure data communications.

1.4.372. The capabilities of the radios varied depending on how they were powered, the antennas used and the frequency type. The radios mounted in Exhibit 139

AVs and Land Rover FFRs were comparable in terms of power and effective range.

1.4.373. During Ex CS, Bowman radios were mounted in the exercising troops AVs (including the Bulldog ambulances) and the Land Rover FFRs used by the company commander and exercise staff. Bowman radios were also carried by individuals, normally by commanders), for use when operating in the dismounted role.

1.4.374. Radio transmissions between exercising troops were recorded immediately prior to the accident. Although transmissions were short, the frequency of transmissions increased as the armoured infantry company attacked the OPFOR positions at Haxton O. Transmissions between the exercise staff and C/S 42A were captured at one point on the recordings, which confirmed that the Bowman communication system was working immediately prior to the accident, although exercise staff and exercising troops did report communications could be intermittent. Exhibit 100

1.4.375. As the Bowman radios mounted in AVs and Land Rover FFRs had the same capabilities, the company commander and exercise staff would not have been able to override the Bowman radio transmissions from the AVs using their radios mounted in the Land Rover FFRs. For this reason, it was almost certain the 'stop, stop, stop' call[124] from the company commander's Bowman radio would not have been received by the crew of C/S 42A. Exhibit 100

1.4.376. A subsequent message was received on the armoured squadron's Bulldog ambulance's Bowman radio, which led to its arrival at the accident scene (approximately 10 minutes after the accident). Witness 17

1.4.377. The panel concluded that Bowman radio was not an effective method of safety intervention due to its inability to override other Bowman radio transmissions. The panel finds this was **an other factor**.

1.4.378. **Recommendation. Deputy Chief of the General Staff should devise and implement an effective method of intervention to enable exercise staff to rapidly stop armoured vehicle movement in order to reduce the risk of accidents occurring during exercises.**

Airwave Network

1.4.379. The Sepura STP9038 TETRA (terrestrial trunked radio) was a hand-portable radio used by the exercise staff, CMT and sub-unit commanders during Ex CS. It operated over the Airwave Network and was colloquially known as an 'Airwave' radio. Exhibit 135

[124] In accordance with the EASP a 'stop, stop, stop' call was to be made on all radio nets in the event of an incident to stop all activity.

1.4.380. Airwave Solutions Ltd, was a British mobile communication company that operated the Airwave Network, which was also used by the UK emergency services.

1.4.381. The radio could use a direct mode operation (DMO) for short distance use to other users (akin to 'walkie-talkies'), or a 'trunked' mode operation (TMO) that used a network of base stations to rebroadcast which allowed for use over longer distances.

1.4.382. The Airwave networked Sepura radios provided excellent clarity and range when used in open terrain. This enabled the exercise staff to communicate between the accident location and the operations room that the RATD had established in Warminster shortly after the incident (approximately 30km away). Witness 2

1.4.383. However, their use inside AVs was limited due to the metal construction of the vehicles' hulls. If used whilst inside an AV, the Sepura radio was unlikely to receive incoming messages and, therefore, was not an effective means of communications to summon medical support.

1.4.384. The panel **observed** that the Airwave networked Sepura radios were an effective means of communications to co-ordinate post-accident activity. However, they were an ineffective means of safety communications when used inside AVs.

Mobile phone

1.4.385. Observer 1 made the initial call to the emergency services direct from the scene of the accident approximately one minute after it occurred. The call was made using a personal mobile phone. Exhibit 61 Exhibit 62 Witness 8

1.4.386. As explored in the information section, the emergency flow diagrams in SPTA RSOs and the Aide Memoire for Troops on SPTA differed. The former required exercise staff to call the emergency services direct, the latter required to them request the emergency services via range control. Both options required the use of a mobile phone. Exhibit 12 Exhibit 121

1.4.387. In this circumstance there were no issues with the mobile phone signal and the call to the emergency services was made direct from the scene. This allowed for a rapid flow of information to the emergency services and advice from the emergency services to the scene of the accident which aided in the assessment of the casualty.

1.4.388. During the call to the emergency services, the paramedic requested Observer 1 to access a link sent to them which would have linked the paramedic via a video link. This would have allowed the paramedic to better assess the casualty. The link did not work. Despite this, the paramedic

received sufficient information to make an assessment that CPR should not be attempted. The panel were unable to determine why the link did not work.

1.4.389. The panel noted the call to the emergency services was made on a personal mobile and not an issued mobile phone. The availability of issued mobile phones was not explored for two reasons:

a. In the panel's experience most personnel choose to use their own mobile phone even when issued one.

b. There was already a mechanism in place for units to demand mobile phones if a communications plan directed personnel to have them.

1.4.390. The panel concluded the use of a mobile phone to co-ordinate the medical response to the accident was **not a factor**.

Personal equipment

1.4.391. The panel examined the personal equipment worn and used by 2Lt George to determine if it offered sufficient protection and to determine if it hampered their exit from C/S 42A.

1.4.392. The equipment examined included the combat protective equipment (CPE) (helmet and body armour), personal protective equipment (PPE) (hearing protection) and load carriage equipment (daysack).

Combat protective equipment (CPE)

1.4.393. **VIRTUS**. VIRTUS was the in-service integrated body armour, helmet and load carriage system. It was scalable and combinable in many configurations to suit an operation or changing threat level. The system was designed to be used with VIRTUS components only (the VIRTUS system instructors guide specifically stated – in red text – that, 'no non-issued load carriage, helmets or tactical vest equipment [were] to be used with the system').[125] It was individually sized to ensure that ballistic coverage, comfort, and freedom of movement were achieved. It was optimised for the light role (dismounted) 'infantryman' to conduct dismounted close combat activity.

Exhibit 90
Exhibit 91
Exhibit 130

a. **VIRTUS body armour**. A Scalable Tactical Vest (STV) (see figure 1.4.26) was part of the VIRTUS torso subsystem that could hold the soft armour filler (SAF) which provided protection against fragmentation, and the ballistic plates which provided high velocity ballistic protection. There were also training plates that simulated the ballistic plates (these provided no protection). The configuration of SAF and ballistic plates worn depended on the threat levels. At the

[125] Source Virtus System Instructors Guide. Page vi, paragraph 9.a.

time of the accident 2Lt George was wearing an STV with SAF fitted and no plates (training or ballistic).

b. **VIRTUS helmet**. The VIRTUS helmet was designed to be lightweight, comfortable and to maximise the levels of visual and audio sensory awareness. The specification of the helmet was to provide protection from blast, fragmentation and blunt impact (such as hand thrown rocks). At the time of the accident 2Lt George was wearing a VIRTUS helmet with the chin strap fastened correctly (see figure 1.4.26).

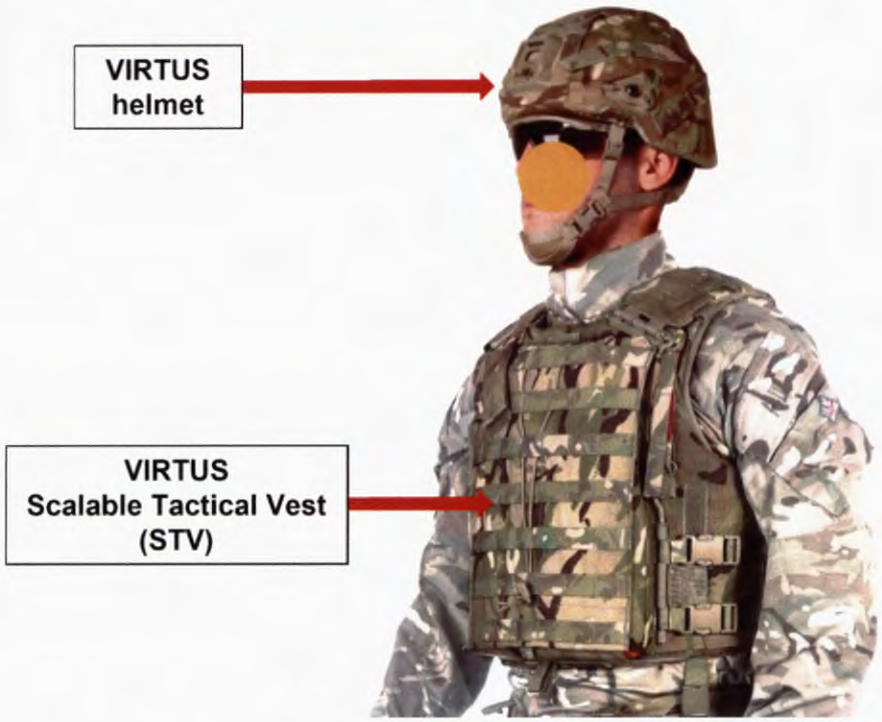


Figure 1.4.26 – VIRTUS Scalable Tactical Vest (STV) and helmet

1.4.394. The VIRTUS body armour (SAF and ballistic plates) and VIRTUS helmet were designed to protect the wearer from blast, fragmentation and blunt impact injuries. They were not designed to protect the wearer from crush injuries. Accordingly they offered no protection for the type of injuries sustained by 2Lt George.

1.4.395. The panel concluded that the combat protective equipment (body armour and helmet) worn by 2Lt George would not have prevented their death and was **not a factor**.

Personal protective equipment (PPE) - hearing protection

1.4.396. Following a review and analysis of vehicle crews' exposure to noise and the risk of noise induced hearing loss, SNvE 1429 was issued on 3 May 2022 giving updated safety advice to AFV crews. Exhibit 8

1.4.397. Part of that advice gave direction on the permitted hearing protection that could be used whilst in Warrior. The list included the 3M™ Combat Arms Ear Plug (CAEP) 4.1 ear plugs (see figure 1.4.27). This was the type being worn by 2Lt George at the time of the accident.

Figure 1.4.27 – 3M CAEP 4.1 ear plug

1.4.398. The 3M CAEP 4.1 ear plugs were a tactical hearing protection system. They had two modes, open and closed. This allowed for the closed setting to be used when exposed to continuous noise (such as travelling in an AV), and the open setting used when greater situational awareness was required (such as operating dismounted and firing a weapon).

1.4.399. The panel concluded that the hearing protection worn by 2Lt George was appropriate and offered adequate hearing protection without diminishing their situational awareness and was **not a factor**.

Load carriage equipment - PRC 354 radio carriage

1.4.400. Bowman PRC[126] 354 radios (see figure 1.4.28) were used by dismounted commanders in infantry platoons to communicate with, command and control their force elements. The VIRTUS load carriage system had a PRC 354 pouch designed to carry the radio that could be attached to a VIRTUS STV or to a separately worn belt (MOLLE Belt). Some users also opted to carry the radio in a daysack. Exhibit 130

Figure 1.4.28 – Bowman PRC 354

[126] PRC – portable radio communications.

1.4.401. 2Lt George was playing the role of the platoon sergeant and had been tasked to debus from C/S 42A and control two dismounted sections. For the task they had a PRC 354 radio which was carried in a non-issued 'Warrior Assault Systems' daysack (see figure 1.4.29). Witness 35

Figure 1.4.29 – Daysack used by 2Lt George

1.4.402. The panel were unable to determine why 2Lt George opted to carry the PRC 354 radio in a non-issued daysack rather than an issued VIRTUS PRC 354 pouch. The panel identified the following issues with the use of the non-issued daysack instead of using an issued VIRTUS PRC 354 pouch.

a. The Warrior Assault Systems daysack was not an issued item and in accordance with the VIRTUS system instructors guide, it should not have been used with the VIRTUS system. The non-issued daysack would not have had a safety case and would not have been trialled or risk assessed for the purpose it was being used. Whilst it may seem a trivial point, there may have been issues of compatibility and interoperability with their other equipment and with operating from Warrior. As explored in section 6, 2Lt George did incur some issues with the daysack or radio whilst exiting C/S 42A.

b. An issued VIRTUS PRC 354 pouch would have been attached to the wearer's STV or MOLLE belt and this would have negated the need to put on a daysack after exiting the vehicle.

c. A radio being carried in an issued VIRTUS PRC 354 pouch would have lowered the antenna profile which in turn, may have reduced the risk of snagging whilst exiting the vehicle (see figure 1.4.30).

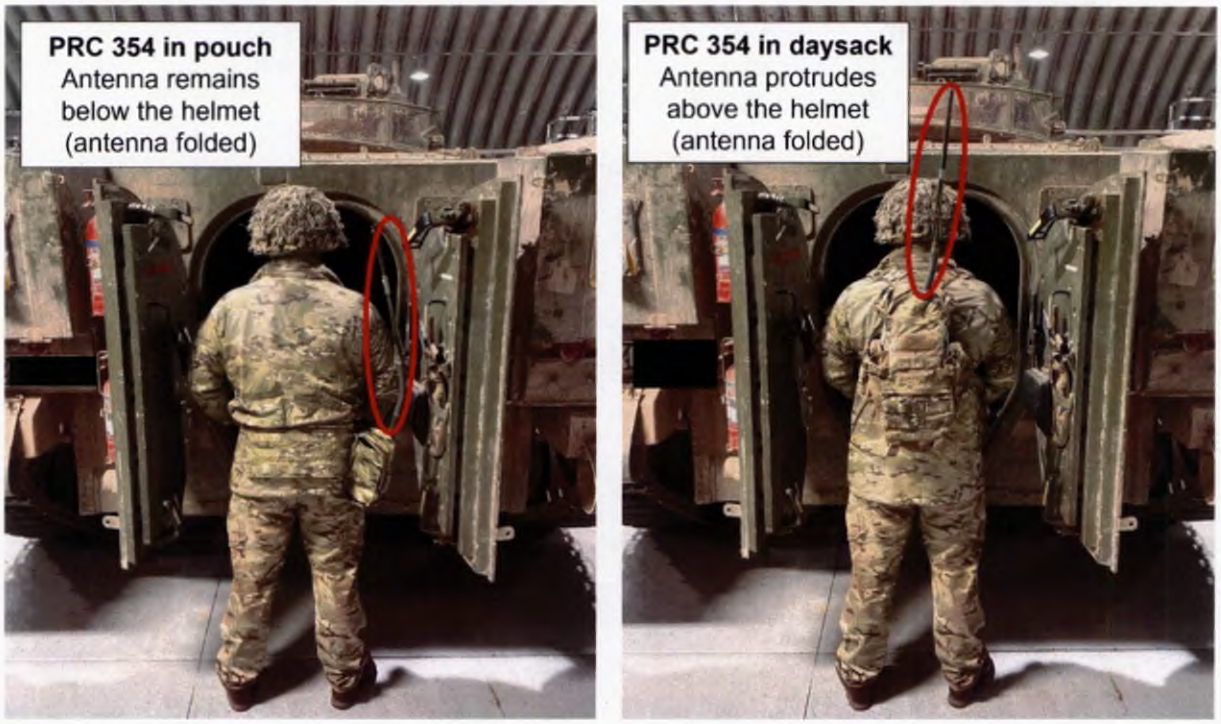


Figure 1.4.30 – Comparison of carriage of PRC 354 radio

1.4.403. The panel did not physically trial the difference between exiting an FV511 with a PRC 354 in a daysack and one carried in a VIRTUS pouch as it concluded that the time to exit C/S 42A was not a factor.

1.4.404. The panel **observed** that the use of a non-issued daysack to carry the PRC 354 was not in line with service policy and it could not be deemed 'safe equipment'.

Section 6 - Training / practice

General

1.4.405. The 'safe practice' element of the SST was outlined in JSP 375. It stated, 'Practices conducted strictly in accordance with drills, procedures and instructions laid down by the Service authorities. These drills and procedures, taking into account the Training Imperative, are identified in the Safety Case and developed in accordance with the defence systems approach to training (DSAT). Safe Practice includes following correct procedures, the provision of effective supervision and delivery of effective training, the briefing of all warnings, cautions and controls together with the use of appropriate Personal Protective Equipment (PPE). Training is only delivered by a competent person to ensure that procedures are strictly adhered to and such instruction and training is closely supervised by the Chain of Command to ensure Safe Practice is implemented.'[127] Exhibit 39

1.4.406. This section examines the training, procedures and practices that were relevant leading up to and at the time of the accident. It also examines the accident in detail and takes into account the human factors (HF) of those involved in the accident.

Training / practice - executive summary

1.4.407. A combination of using equipment in a way in which it was not intended (a Warrior FV511 command variant as a platoon vehicle), a lack of prescribed 'safe practice' for personnel to safely debus from the FV511, and a training deficiency in the student commander's training progression created an aggregated risk that was not identified, assessed or mitigated. The risk was further exacerbated by the lack of a recognised method for supervising student armoured vehicle commanders undergoing tactical training. These shortfalls, when combined with the use of an FV511 that had a non-functioning rear door alarm (that had been retrofitted to prevent such accidents), presented a heightened and credible risk to life which set the conditions for the accident to occur.

Joint Service Publication (JSP) 822 – Defence Direction and Guidance for Training and Education

1.4.408. JSP 822 was the authoritative policy that directed and guided defence people to ensure that defence individual and collective learning (training and education) was appropriate, efficient, effective and, most importantly, safe. Underpinning all training and education activities was the defence systems approach to training (DSAT). It was the system that had to be used by those who were involved in the analysis, design, delivery, assurance, management and governance of defence training and Exhibit 19

[127] JSP 375 volume 1, chapter 40 (V1.3 Jan 22). Page 6, paragraph 31.

education. There were four elements to the DSAT process which are illustrated in figure 1.4.31.

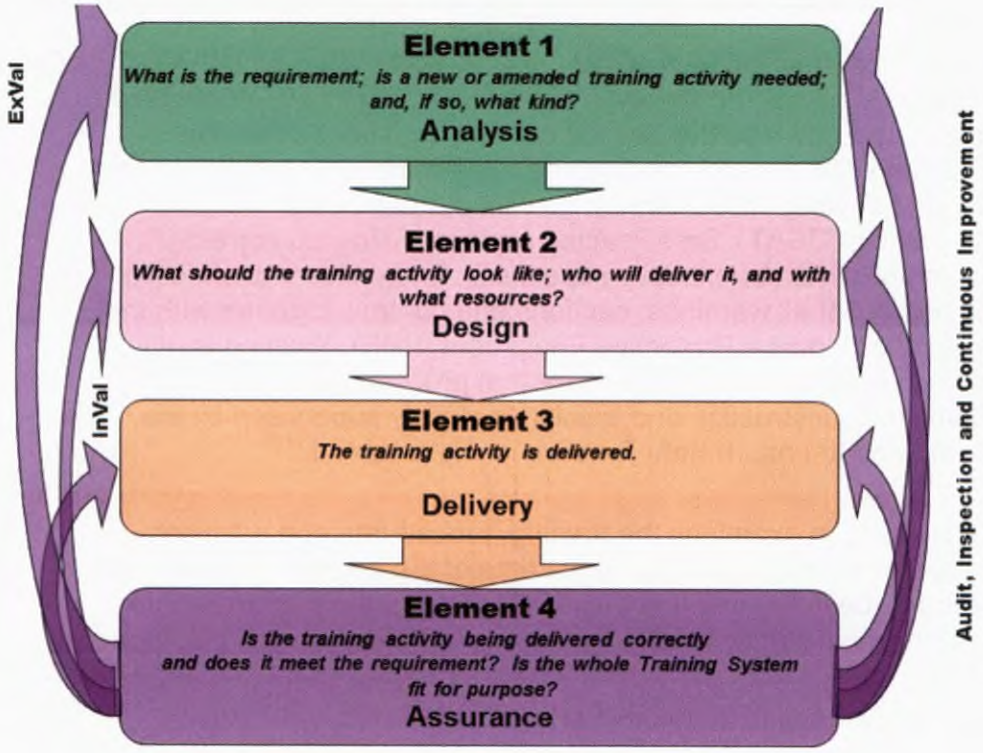


Figure 1.4.31 – The four elements of DSAT

1.4.409. Course documentation, including the learning 'scalar', learning specification (LSpec), assessment specification (ASpec), assessment strategy (AStrat), role performance statement (RPS), formal training statement (FTS), and TPS, was the trainers' crucial link to the DSAT process. The course documentation provided the authority to deliver standardised training and formed the basis for the production of course programmes, lesson plans and assessments.

Armoured Infantry Platoon Commander Course (AIPCC)

1.4.410. The AIPCC consisted of four modules which were conducted in the following sequence (course identifying number in brackets): AIPCC CIS (630V), AIPCC D&M (630D), AIPCC Gunnery Course (630G) and AIPCC Tactics (630T). The first three modules were 'technical' modules[128] which students had to successfully complete before advancing to the AIPCC Tactics module. Each module was delivered by separate schools. The technical modules were conducted by AFVSR schools: CIS – Combat CIS School, Gunnery – AFV Gunnery School and D&M – D&M Combat Support Wing. The AIPCC Tactics module was delivered by RATD. The training documentation for each module was contained in their respective course

[128] The technical modules covered the 'procedural' aspects of commanding Warrior, the fourth module covered the tactical employment and consolidated the technical elements taught during the first three modules.

folders, of which there were four chapters for each. The key documents within each chapter of the folders were:

a. **Chapter 1 – Course specification**

(1) **Learning scalar**. The representation of training objectives (TOs)[129] and their dependent enabling objectives (EOs)[130] and key learning points (KLPs).[131]

(2) **Course programme**. The detailed programme of timings, subject and location of training.

b. **Chapter 2 – Role performance statement (RPS) / formal training statement (FTS)[132]**

(1) **RPS**. The detailed statement of the tasks / sub-tasks required to be undertaken by an individual to achieve the desired performance (performance, conditions and standards) in the role. The information in the RPS informs the design of training.

(2) **TPS**. The statement of the TOs (in terms of performance, conditions and standards) to be attained by trainees.

(3) **Training categories**. JSP 822 and chapter 2 of the course folders listed six training categories (see table 1.4.4). Training Category 1 was the most comprehensive training. The degree of training and competency required by the trainee gradually reduced in categories 2 to 6, with Training Category 6 requiring no training at all.

[129] JSP 822 (V4.1 Nov 21) Part 1, Section 10 – Glossary, page 269. TO - Statements of training output to ensure that the training activity is focussed with a definite purpose such that the defence need is met.
[130] JSP 822 (V4.1 Nov 21) Part 1, Section 10 – Glossary, page 245. EO - A lower level (to TO) statement in behavioural terms (performance, conditions and standards) that describes the knowledge, skills and attitudes (KSA) necessary for the trainee to achieve all or part of a TO.
[131] JSP 822 (V4.1 Nov 21) Part 1, Section 10 – Glossary, page 249. KLPs - Important points contained within the development of the LSpec. They can also be referred to as teaching points.
[132] JSP 822 (V4.1 Nov 21) Part 1, Section 10 – Glossary, page 246. The FTS details the totality of the training that must be achieved to meet the requirements articulated in the RPS. The FTS comprises a training performance statement (TPS), a workplace training statement (WTS), and a residual training gap statement (RTGS).

Training Category	Definition
1	By the end of the training activity the trainees will have performed the whole task several times, to the full role standard, and under realistic scenarios and conditions in which the physical, functional, tactical, and environmental fidelities were accurately reproduced. The trainee will be able to perform the task competently, immediately on arrival in the workplace.
2	By the end of the training activity the trainee will have performed the whole task at least once to full role standards, under realistic physical, functional, tactical, and environmental conditions and in a realistic scenario. The trainee should be able to perform the task on arrival in the workplace
3	By the end of the training activity the trainee will have performed the whole task at least once in a training environment to a lesser standard than required in the role (safety standards to be met in full).
4	By the end of the training activity the trainee will have demonstrated an adequate level of underpinning knowledge and principles required but will not have applied it to develop the skills required to perform the task.
5	All training delivered in, or under the auspices of, the workplace.
6	Trainees do not require any training.

Table 1.4.4 – Training categories[133]

c. **Chapter 3 – AStrat / ASpecs**. The AStrat described the overarching assessment policy for the course / module and the associated rationale. The ASpec described the organisation, type of test, marking details, pass / fail criteria for the assessment of TOs and the consequences of failure.

d. **Chapter 4 – LSpec.**[134] The details of the EOs and associated KLPs, the relevant assessment / test, method and media selected, time allocated, resource requirements and essential references.

AIPCC – Driving and Maintenance (D&M) module

1.4.411. The 12-day D&M module was delivered by the AFVSR Combat Support Wing. The aim of the module, stated in chapter 1 of the course folder, was 'to train students to become an AIPCC D&M AA Warrior Crew Commander (Non-Trained)'. The TOs, EOs and KLPs for this module were listed in the learning scalar at annex A to chapter 1 of the course folder. Exhibit 21

1.4.412. TO 7 was listed as 'Command Warrior by day and night'. An associated KLP to this TO was to conduct embussing and debussing procedures (KLP 7.1.1), it did not specify from which variant of Warrior. The training category for this TO was listed in the module's TPS at annex B to chapter 2 of the course folder, as Training Category 2. The definition for Training Category 2 reflected in JSP 822 and chapter 2 of the course folder as: 'By the end of the training activity the trainee will have performed the Exhibit 19 Exhibit 22

[133] JSP 822 (V4.1 Nov 21), Part 2, page 42.
[134] JSP 822 (V4.1 Nov 21), Part 1, Section 10 – Glossary, page 250. LSpecs usually contain the details of an EO and associated KLPs, the relevant assessment / test, method and media selected, time allocated, resource requirements and essential references.

whole task at least once to full role standards, under realistic physical, functional, tactical, and environmental conditions and in a realistic scenario. The trainee should be able to perform the task on arrival in the workplace.' One of the conditions listed was 'closed down for unspecified periods.'

1.4.413. The training during the D&M module was focused on the FV510 and overviews of the other variants were briefed. There was no prescribed debussing procedure for the FV511 and debussing from this variant was not taught. The training that did occur for the debussing procedure only related to the FV510, for which there was a prescribed debussing procedure. This was contained in AESP 2350-T-201-201 (FV510 Operating Information). Exhibit 58

1.4.414. The debussing KLP was programmed to be delivered during the second week of the module. Student Commander 3 could not recall receiving formal instruction on the debussing procedure during the D&M module or practicing the procedure. Student Commander 1 did recall the debussing procedure being explained from a dismount's perspective, but not from a Warrior commander's perspective. Student Commanders 4 and 5 recalled being talked through the mechanics of exiting an FV510 including how to operate the rear door, but not practicing the debussing procedure. None of the students recalled commanding whilst 'closed down' during the D&M module. Exhibit 21 Witness 34 Witness 35 Witness 36 Witness 39

1.4.415. A DMI from the Combat Support Wing, outlined that during the D&M module, debussing procedures from an FV510 were explained and walked through, then confirmed by question and answer with the students, but not practiced under realistic conditions. Reasons given for not conducting the training under realistic conditions were a lack of instructors to safely supervise the activity, and that the D&M Combat Support Wing did not deliver tactical training, nor was it resourced to. Witness 47

1.4.416. Based on the evidence, the panel determined that the debussing training delivered during the D&M module, only related to the FV510 variant and only to Training Category 4. In the panel's opinion, it was logical that the training related to the FV510 as this was the variant used by platoon commanders (the FV511 was a command variant, not a platoon vehicle). Whilst the reasons for not teaching to Training Category 2 were understood, it fell short of the standard as prescribed in the TPS creating a training deficiency[135] which led to a shortfall in the students' competency.[136]

1.4.417. The debussing training delivered on the D&M module was likely to have given Student Commander 1 the knowledge underpinning the Exhibit 158

[135] JSP 822 (V4.1 Nov 21) Pt 1, Sect 10 – Glossary, Page 267. Training deficiency. A shortfall in intended training that was not agreed by the TRA. Training deficiencies exist where deficiencies have arisen owing to either an inability to train certain TOs / CTOs or a training failure that has been picked up through the assurance process. Such deficiencies would suggest that trainees may not hold the competences that the training was designed to deliver.

[136] JSP 822 (V4.1 Nov 21) Pt 1, Sect 10 – Glossary, Page 241. Competency. The performance of a specific skill, attitude or behaviour needed to do a job.

debussing procedure for an FV510. However, due to the training deficiency and lack of practical application of the debussing procedure during the D&M module, including when 'closed down', Student Commander 1 would not have experienced the challenges of debussing dismounts from a Warrior whilst commanding under realistic conditions before progressing to the AIPCC Tactics module. These challenges are reflected in detail in the HF Report (paragraphs 82 to 83) and include the need to simultaneously co-ordinate C/S 42A's driver, gunner and dismounts, monitoring two radio nets, factoring the enemy's activity, commanding a dismounted platoon and coping with a reduced situational awareness due to limited arcs of visibility whilst operating 'closed down'.

1.4.418. The panel concluded that Student Commander 1 was not adequately trained or sufficiently practised and had not been assessed as a Warrior commander in the process of debussing personnel from an FV510 or FV511 prior to progressing to the AIPCC Tactics module. Therefore, they would not have been sufficiently competent as a Warrior commander to conduct the debussing procedure in a tactical scenario due to the training deficiency. The panel finds this training deficiency was a **contributory factor**.

1.4.419. **Recommendation. Director Land Warfare should ensure that student armoured vehicle (AV) commanders are trained to debus personnel to Training Category 2, and summatively assessed to ensure they are competent in the procedure, before they conduct any tactical training as an AV commander (where the type and variant of AV that they command has a passenger carrying capability).**

AIPCC – Communications Information Systems (CIS) module

1.4.420. The 15-day CIS module was delivered by the AFVSR Combat CIS School. The TOs related to the CIS aspects of an armoured infantry platoon commander's duties and communication using the CIS systems associated with Warrior.

1.4.421. The module did not relate directly to the debussing procedure. It did, however, cover the IC system which the Warrior crew used to communicate between themselves and with the dismounts in the section working compartment of an FV510 and an FV511. This was listed as a KLP in the learning scalar for the module as '630.5.2.6 Operate Platform IC using the UCD'.[137] This KLP was taught on day 12 of the course which was listed in the course programme as the 'UCD' and the 'Configure FFL'[138] lessons. Students confirmed the module taught them the aspects of the communication system associated with Warrior.

Exhibit 37
Exhibit 38
Witness 34
Witness 36

1.4.422. An AIPCC student recalled that students were informed that the FV511 was a platoon commander's vehicle due to the different

Exhibit 3
Witness 36

[137] UCD – User Control Device.
[138] FFL - Fully Functional LAS (Local Area Sub-system).

communications set-up. The Warrior CONUSE shows the FV510 is the platoon vehicle, whereas the FV511 is the command vehicle for commanding officers, company commanders, company 2ICs and platoon and section commanders within anti-tank platoons. The significances of the differences between the FV510 and FV511 are examined in section 5.

1.4.423. The panel assessed it was as likely as not, that students were incorrectly informed that the FV511 was a platoon commander's vehicle. As this was the students first exposure to Warrior, this could have led to student commanders not realising they were operating FV511s in a way that it was not intended, as outlined in the CONUSE. Had they realised, they may have been more alert to the additional risks[139] created by using an FV511 as a 'fighting vehicle' and mitigated them accordingly.

1.4.424. The panel concluded that the CIS module of the AIPCC adequately prepared the student commanders to communicate using the Warrior's communication system, including with dismounts in the section working compartment of a Warrior and was **not a factor**.

1.4.425. The panel concluded that AIPCC students did not have a clear understanding of the different Warrior variants and the risks presented by using them in a role for which they were not intended. The panel finds this was **an other factor**.

1.4.426. **Recommendation. Director Land Warfare should ensure that all those responsible for the delivery of Warrior training, understand the intended use and limitations of all variants of Warrior in order to ensure the correct information is used when instructing.**

AIPCC - Gunnery Course

1.4.427. The four-week gunnery course was delivered by the AFV Gunnery School. The course was a module of the AIPCC, it was also a stand-alone course for Warrior crew commanders and Warrior gunners. The course trained students to become qualified Warrior gunners. Exhibit 30

1.4.428. The Gunnery Course content covered a variety of subjects related to operating the Warrior 30mm Cannon, 7.62mm Hughes Chain Gun, smoke grenade dischargers and associated sighting systems. It did not involve dismounted troops.

1.4.429. The panel concluded that the Gunnery Course played no part in the accident and was **not a factor**.

[139] For example the reduced situational awareness and increased time to debus brought about by an FV511 not having a 'door clear' switch to inform the crew that troops have exited the vehicle and manual rear doors which are more complex to close, both of which increase the risk of a reversing accident involving debussing personnel.

AIPCC - Tactics phase

1.4.430. The four-week AIPCC Tactics module was delivered by the RATD. It was the final module of the AIPCC and covered armoured infantry platoon tactics. The AICC course (630U) ran concurrently. The students on the 630U course were non-commissioned officers (NCOs) who underwent their CIS, D&M and gunnery training at their own units, conducted by their unit training staff as distributed training (DT).[140] The 630T and 630U courses shared the same course content. These elements were joined by the Armoured Troop Leader and Armoured NCO Commander courses for the final exercise (Ex CS). Exhibit 25

Role specification / RPS / TOs

1.4.431. JSP 822 showed that TOs are determined based on the performance, conditions and standards set out in the RPS.[141] The RPS for the AIPCC Tactics module (630T) was located at annex A in chapter 2 of the course folder, annex B to chapter 1 of the course folder contained the role specification for an armoured infantry platoon commander. They outlined the roles and responsibilities for an armoured infantry platoon commander, they did not contain the specific details for NCO Warrior crew commanders. Exhibit 19 Exhibit 25 Exhibit 26

1.4.432. The role specifications were comprehensive and listed the armoured infantry platoon commanders' responsibilities which pertained to commanding an AV (Warrior) and an armoured infantry platoon. However, the RPS, used to inform training design, only listed performances that related to platoon commander functions and not Warrior commander functions. Accordingly, the TOs, EOs and KLPs in the learning scalar related only to platoon commander functions and not Warrior commander functions. This was also reflected in the TPS, AStrat and ASpec. Exhibit 25 Exhibit 26 Exhibit 27

1.4.433. The RPS resulted in an AIPCC Tactics programme that was aimed at platoon level tactics. There were no periods formally programmed, in which to train, practice and assess students in Warrior tactics, techniques and procedures (TTPs) specifically involving dismounts. This jump from the 'technical' procedural training of the previous three modules, to platoon level tactics, led to student commanders having a competency deficiency in their operations with dismounts.

1.4.434. The panel concluded that the lack of low-level TOs and assessments pertaining to Warrior TTPs with dismounts in the AIPCC Tactics module, exacerbated the risk created by the debussing procedure not being trained to Training Category 2 during the D&M 'technical' module. The panel finds that the lack of formal training, practice and assessment of

[140] JSP 822 (V4.1 Nov 21) Part 1, Section 10 – Glossary, Page 245. DT is the formal training to deliver the TPS that is undertaken away from the organisation responsible for the development, maintenance and management of the training.
[141] JSP 822 (V4.1 Nov 21) Part 2, Page 80 paragraph 2.a.(1).

Warrior TTPs involving dismounts during the AIPCC was a **contributory factor**.

1.4.435. The panel **observed** that there was little reference to the specifications for the JNCO students in the AIPCC Tactics module (630T) course folders. Their role specification was subtly different to the platoon commander students, and this left a deficiency in crew commander specific TOs.

1.4.436. **Recommendation. Director Land Warfare should ensure that the lead training requirements authority for Warrior commander qualifying courses, amends the relevant role performance statements and training objectives to include Warrior tactics, techniques and procedures involving dismounts.**

1.4.437. **Recommendation. Director Land Warfare should ensure that the lead training delivery authority amends the training design of Warrior commander qualifying courses to ensure Warrior commander students undertake Warrior tactics, techniques and procedures training involving dismounts, before progressing to platoon level tactics.**

Start standards

1.4.438. The criteria to progress to the AIPCC Tactics module was laid out in the course joining instructions which stipulated, 'platoon commanders must have passed PCBC and previously completed the technical phases of AIPCC (CIS, DMI and gunnery)'. This criteria was also reflected in the AIPCC Tactics module start standards stipulated in chapter 1 of the course documents. Exhibit 11 Exhibit 25

1.4.439. The sequencing of the modules (CIS, D&M, gunnery then tactics)[142] ensured students had the requisite skill sets to progress safely to the next phase and ultimately to the tactics module. This created a dependency on each school to ensure students conducted the training in each module to the requisite standard as laid out in the respective TPS. If the standard was not met in one module, risk would be carried forward to the following modules. Exhibit 41

1.4.440. The residual training gap statements (RTGS)[143] were located in annex D of chapter 2 in the course folders. The debussing KLP had not been identified in the course folders as an RTGS. Nor had the course reports from the D&M module identified the debussing KLP as a training deficiency. For these reasons RATD could have reasonably expected that students were competent at debussing personnel from a Warrior that they Exhibit 22 Exhibit 26 Exhibit 32 Exhibit 33

[142] Course dates: AIPCC CIS (630V) - 14 March to 1 April 2022, AIPCC D&M (630D) - 4 to 21 April 2022, AIPCC Gunnery Course (630G) - 22 April to 27 May 2022 and AIPCC Tactics (630T) - 30 May to 24 Jun 2022.
[143] JSP 822 (V4.1 Nov 21) Pt 1, Sect 10 – Glossary, Page 258. RTGS - The difference between the totality of the training received and the RPS. It is where an element of the RPS has not been allocated a training activity.

were commanding prior to starting the AIPCC Tactics module. The RATD staff reported start standard criteria were diligently checked prior to students commencing the tactics phase. As there was no evidence to suggest students had not met the start standard criteria for the AIPCC Tactics module, the risk went unnoticed.

1.4.441. The panel noted that on completion of the first three 'technical' modules and in accordance with AVSOs, student commanders were qualified to command Warrior on point-to-point moves in non-tactical scenarios, but still deemed not 'fully competent'. AVSOs stated: 'an AV Commander is [only] deemed to be fully competent when tactically trained by the appropriate ARMCEN delivered AFV tactics course for Infantry turreted platforms [such as Warrior]'. This stipulation had not always been in place and many Warrior commanders in the Field Army had not undertaken an appropriate ARMCEN delivered AFV tactics course. An interim solution was introduced in April 2021 allowing those who had not conducted an ARMCEN course to operate under a waiver if they met certain criteria.[144] One criterion was 'Judged to be 'good enough' by the Bn [battalion] CO'. This service inquiry did not explore the scale of personnel operating under a waiver or the levels of scrutiny and thresholds that COs applied in submitting waivers for their personnel. Exhibit 20 Exhibit 45

1.4.442. The panel concluded that the sequencing of the four modules of the AIPCC was logical and that this was **not a factor**.

1.4.443. The panel concluded that the RATD staff had shown due diligence in checking student records to ensure that they met the AIPCC Tactics module start standards, and that this was **not a factor**.

1.4.444. The panel concluded that the RATD staff were unlikely to be aware that the debussing procedure had not been taught, practised and assessed in line with the TPS during the D&M module and students would not have been sufficiently competent as Warrior commanders to debus personnel during a tactical exercise. The panel finds that the lack of debussing procedure training was a **contributory factor**.

1.4.445. The panel **observed** that the Armoured Infantry Warrior Crew Commander Tactical Training Waiver (LWC_04_06_07_02 STT (MCC) dated 29 Apr 21) for personnel who had not conducted an ARMCEN delivered tactics course, presented risk if there was a deficiency in an individual's training progression that was not identified in the waiver application process.

1.4.446. **A recommendation has already been made at paragraph 1.4.419, that the Director Land Warfare should ensure that student armoured vehicle (AV) commanders are trained to debus personnel to Training Category 2, and summatively assessed to ensure they are competent in the procedure, before they conduct any tactical training**

[144] LWC_04_06_07_02 STT (MCC) dated 29 Apr 21. Armoured Infantry Warrior Crew Commander Tactical Training Waiver.

as an AV commander (where the type and variant of AV that they command has a passenger carrying capability).

1.4.447. **Recommendation. Director Land Warfare should review the Armoured Infantry Warrior Crew Commander Tactical Training Waiver (LWC_04_06_07_02 STT (MCC) dated 29 Apr 21) and any updated version, to ensure that waivers are only issued to those who have been formally assessed in debussing personnel from Warrior.**

AIPCC – theory

1.4.448. The first week of the AIPCC Tactics module consisted of classroom-based theory training, interspersed with practical mobile navigation conducted in Land Rovers and a tactical exercise without troops.[145] During the second week the course conducted synthetic tactical training using the Combined Arms Tactical Trainer (CATT).[146] Exhibit 41

1.4.449. The theory training conducted during the first two weeks bridged the gap between students' knowledge of dismounted close combat and mounted close combat. It also introduced vehicle navigation using Land Rovers, which would have highlighted to students some of the challenges of navigating whilst commanding Warrior.

1.4.450. The panel concluded that the classroom-based training conducted during the first two weeks of the AIPCC Tactics module provided sufficient knowledge to ensure students understood the theoretical aspects of the armoured infantry platoon commander role and that this was **not factor**.

Exercise COMBAT SPIRIT (Ex CS)

Ex CS – regulations

1.4.451. **Pam 21**. Ex CS was a blank firing exercise involving AFVs, infantry weapon systems and pyrotechnics. The regulations that govern the planning, conduct and supervision of such exercises were contained in Pam 21 (see section 1). Pam 21 stated that the application of the regulations was mandatory and approved 'best practice', enabling realistic and demanding training whilst ensuring that risks were reduced to ALARP. Exhibit 43

1.4.452. **AVSOs**. AVSOs (see section 1) provided military direction to commanders and troops to apply in their operations and training. They were based on the most up to date experience and best practice available. Exhibit 20

[145] A walk-though talk-through exercise where theoretical tactics are talked through with students and instructors using the ground to illustrate key points.

[146] 20141107-Annex D (CATT) to CSTTG Blue Book Under Review v1-R. The CATT uses an immersive simulation system to create a simulated training environment for units to conduct Foundation Training (FT) and brigades and battle groups to conduct Mission Specific Training (MST). It improves battlefield awareness and exercises command, control and decision making at all levels, by means of an intense and disciplined training regime supported by objective after-action review (AAR) processes. This enables units to reach a high level of combat effectiveness within a very short time.

The orders covered all AVs, whether tracked or wheeled. Failure to comply with the orders may have amounted to a disciplinary offence under the Armed Forces Act 2006, and may have also amounted to a criminal offence under the Health & Safety at Work Act 1974.[147]

Ex CS - planning

1.4.453. The planning process for all forms of training with AFVs, infantry weapon systems and pyrotechnics was contained in chapter 2 of Pam 21. Specific planning considerations for blank firing exercises were contained in chapter 3. Exhibit 43

Directed training

1.4.454. The AIPCC Tactics module was a defined RATD output and was reflected in the statement of training tasks (SOTT)[148] for them to deliver as the training provider. However, there was no training authorisation document (TrAD).[149] Exhibit 34

1.4.455. Despite a lack of formal agreement between the TRA, TDA and TP in the form of a TrAD, TOs did exist (contained in the learning scalar - annex A to chapter 1 of the 630T course folder). The definition of TOs is: 'Statements of training output to ensure that the training activity is focussed with a definite purpose that the Defence need is met'.

1.4.456. The panel **observed** that the lack of a TrAD for the AIPCC Tactics module was a procedural deficiency, and the presence of clearly defined TOs and a valid SOTT for the module was sufficient for this to be classed as 'directed training' to meet the spirit of Pam 21.

Exercise appointments

1.4.457. The staff appointments were listed in the EASP. The assessment of their qualifications and suitability is explored in section 3 of this report. Exhibit 7

1.4.458. The panel noted the reference to 'Assistant ECOs' in the EASP, of which two were appointed, an armoured instructor and an armoured infantry instructor. The terminology 'assistant' ECO was not listed in Pam 21 and their roles were not defined in the EASP. The ECO confirmed that the two assistant ECOs had specific ECO responsibilities for their armoured or armoured infantry groupings, in a similar manner that a range Exhibit 7 Witness 3 Witness 6

[147] AVSOs. Page iii.
[148] JSP 822 (V4.1 Nov 21) Pt 1, Sect 10 – Glossary, Page 261. SOTT - A document generated by the TDA [in conjunction with the training provider] by taking the agreed output-based requirement articulated in the SOTR (statement of training requirement) and developing it into a deliverable training plan for the following TY (training year).
[149] JSP 822 (V4.1 Nov 21) Pt 1, Sect 10 – Glossary, Page 266. TrAD - the document which defines who is responsible for what during the life of a training activity. Essentially, it is the signed contract between the TRA, TDA and Training Provider and is a key document in the holding to account process. Every training activity across Defence must have a related TrAD. There are no exceptions.

conducting officer (RCO) is subordinate to a senior RCO and responsible for their specific areas during large scale live firing exercises. However, the armoured infantry assistant ECO understood that their role was to deputise should the ECO be required to leave the exercise for any reason.

1.4.459. The panel concluded that the disparity between the two explanations of the assistant ECO role and the use of a non-defined term (i.e. not defined in Pam 21) identified that responsibilities were not well understood by all exercise staff, and this could have led to a shortfall in the managerial oversight of the exercise. The panel finds that the lack of understanding of the exercise staff responsibilities to be **an other factor**.

1.4.460. **Recommendation. Director Land Warfare should review the requirement to establish a role of a 'senior exercise conducting officer' for large scale blank-firing exercises (above platoon level), in a similar way that senior range conducting officers are appointed for large scale live firing exercises, to ensure large and complex exercises are safely managed and staff responsibilities are clearly understood and defined. The role, if established, should be defined in the appropriate pamphlet.**

Confirmation of resources

1.4.461. The process for requesting SET troops was set out in the Army's Land Operations Command's (LOC) Standard Operating Instruction 009 (SOI 009) dated 4 August 2021. The SOI required demands to be submitted to LOC by 31 July in the year preceding the activity to allow the LOC time to identify and allocate troops for the task.

Exhibit 47
Exhibit 48

1.4.462. For Ex CS, the RATD had requested sufficient workforce and equipment to form an armoured infantry company and an armoured squadron, in addition to the supporting elements and an OPFOR. A total of 12 FV510 with drivers and commanders[150] had been requested to make up the three platoons required for an armoured infantry company (see figure 1.4.32). The LOC allocated the task to the 3rd (UK) Division on 7 December 2021. 3rd (UK) Division allocated the task to 20 ABCT on 7 April 2022, 20 ABCT nominated 5 RIFLES for the task on 25 April 2022. Ex CS's planning officer / ECO later confirmed in an e-mail to a staff officer (SO3 G3) in 20 ABCT's HQ on 5 May 2022, that the minimum number of FV510s required was eight. This was four less than originally requested. The reduction was based on the lower than anticipated number of armoured infantry students attending Ex CS (eight in total), and that the armoured infantry company could therefore operate with two platoons, not three.

Exhibit 49
Exhibit 53
Witness 3

[150] Gunners were not demanded; the SET Warrior commanders would act as gunners when students assumed the role as Warrior commanders (commanders are also qualified gunners).

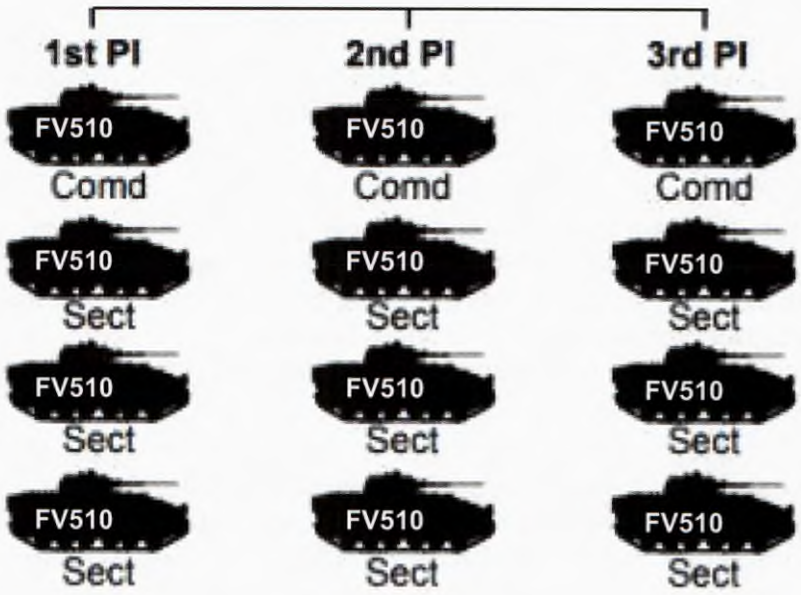


Figure 1.4.32 – Armoured infantry company (platoon vehicles)

1.4.463. Due to gapping in the workforce, equipment shortfalls, training courses and other commitments, 5 RIFLES only provided six FV510s and two FV511s, which was insufficient to meet the requirements for two platoons. A compromise was made and the two FV511s were to be used as the platoon commander vehicles (see figure 1.4.33).

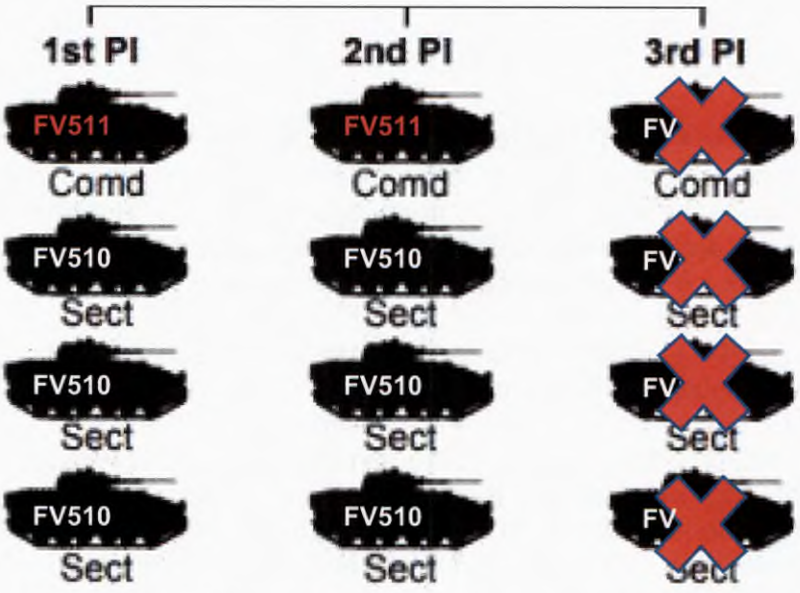


Figure 1.4.33 – Ex CS armoured infantry company (platoon vehicles)

1.4.464. The use of FV511s as platoon vehicles fell outside of their intended use as defined in the CONUSE, presenting additional hazards (see section 5). When a change in situation such as the use of equipment as not intended (which falls outside of the SSW) arises, and / or when a lack of resources requires a change to the force structure (i.e. the

Exhibit 3
Exhibit 51

armoured infantry company operating with two platoons instead of three), a dynamic risk assessment (RA) should have been conducted to identify additional hazards and control measures in accordance with Army Command Standing Order No 1200 (ACSO 1200).[151] The panel found no evidence of a dynamic RA having been carried out on this occasion for either the lack of resources, or for FV511s to be employed as FV510s.

1.4.465. The panel concluded that Ex CS was not adequately resourced which led to the FV511 being used outside of its safe operating envelope and without further risk assessment. The panel finds that the use of the FV511 being used outside of its safe operating envelope was a **contributory factor**.

1.4.466. **Recommendation. Chief of Staff Field Army should ensure that Warrior commander qualifying courses are adequately resourced to ensure that safety is not compromised due to a lack of resources and that training objectives can be achieved within a safe system of work.**

1.4.467. **Recommendation. Director Land Warfare should ensure that those responsible for the planning and delivery of armoured infantry training, conduct a risk assessment where insufficient resources could impact on the delivery of a safe system of training, to ensure appropriate controls are put in place to reduce safety risks to as low as reasonably practicable (ALARP), or cease activity if this cannot be achieved to a tolerable level.**

Training area recce

1.4.468. This aspect is covered in section 4.

Ex CS - risk assessment (RA)

1.4.469. The Army's safety risk management process was outlined in chapter 4 of ACSO 1200. Pam 21 outlined the RA process for military training (page 2-13, paragraph 2-28) and JSP 375 Vol 1 chapter 8 listed five principal steps to be followed when conducting an RA. In accordance with Pam 21, the hazards and controls identified during the RA process for Ex CS, were recorded in an RA which formed annex D to the EASP.

Exhibit 7
Exhibit 43
Exhibit 51
Exhibit 52

1.4.470. The planning officer / ECO was recorded as the risk assessor and the assessment date was recorded as 30 May 2022. The planning officer / ECO was also listed as the authorising officer, whose electronic signature on the RA (dated 7 June 2022) denoted that they agreed with existing and additional controls. Exercise Director 1 was listed on the RA as

[151] ACSO 1200 The Army's Safety and Environmental Management System, issued January 2021. Page 67 paragraph 25. 'If parts of the SSW are missing, or do not cover the activity, then the additional hazards and their corresponding controls, must be added to the risk assessment in the standard format for SSW risk assessments'.

the individual confirming 'additional controls implemented', although it was not signed or dated by them.

1.4.471. Ex CS's RA had been recorded on a version of the MOD Risk Assessment Form (MOD Form 5010). The form used differed from the Health Safety & Environmental Protection Directorate's template at the time of the accident (MOD form 5010 version 1.3 07/2020). Version 1.3 used a 3 x 3 RA impact grid (see figure 1.4.34), whereas the version used in Ex CS's RA had a 5 x 5 impact grid (see figure 1.4.35 with criteria listed in table 1.4.5), which was in line with the direction in ACSO 1200. Exhibit 51

Likelihood		Risk Matrix		MOD Form 5010 (V1.3 07/2020)
Common, regular or frequent occurrence.	3	3 Med	6 High	9 High
Occasional occurrence.	2	2 Low	4 Med	6 High
Rare or improbable occurrence.	1	1 Low	2 Low	3 Med
Severity		1 Minor injury or illness.	2 Serious injury or illness.	3 Fatalities, major injury or illness.

Figure 1.4.34 – MOD Form 5010 (V1.3 07/2020) 3 x 3 RA impact grid

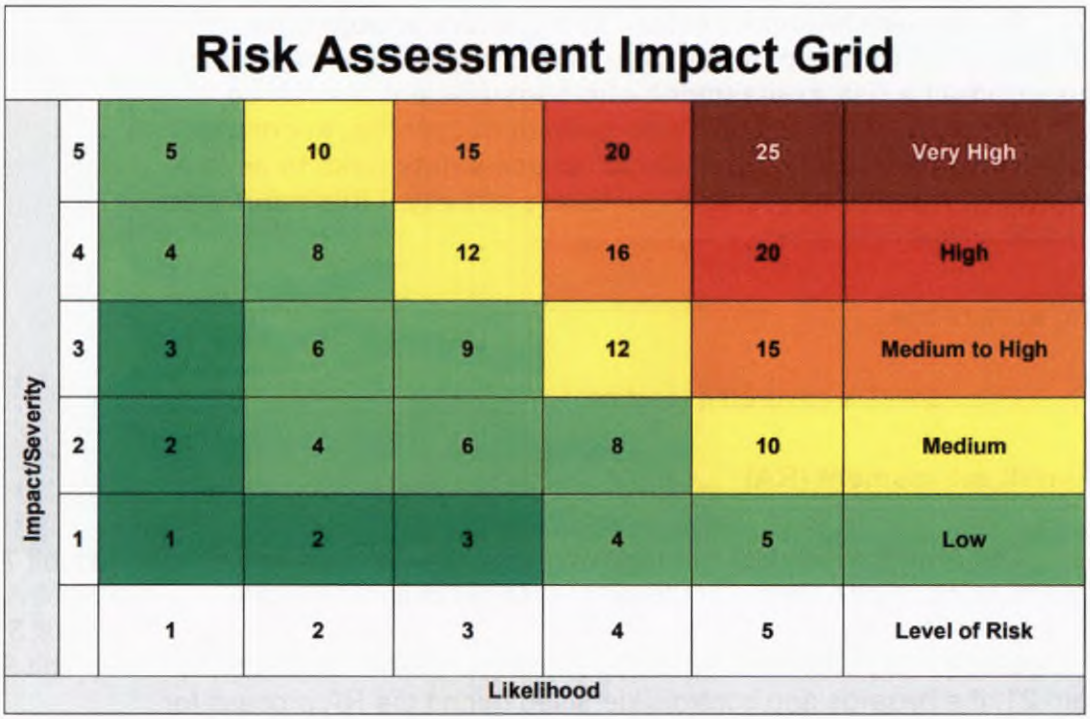


Figure 1.4.35 – ACSO 1200 5 x 5 RA impact grid

Likelihood		Definition		Impact/Severity	
5	Highly Probable (Almost Certain)	Is expected to occur in most circumstances		5	Multiple fatalities or permanent life changing injuries
4	Probable	Will probably occur at some time, or in most circumstances		4	A single death or multiple life-threatening injuries
3	Possible	Fairly likely to occur at some time, or some circumstances		3	A single life changing injury or multiple injuries which have a short-term impact on normal or quality of life
2	Unlikely	Is unlikely to occur, but could occur at sometime		2	Multiple injuries requiring first aid
1	Remote/Rare	May only occur in exceptional circumstances		1	An injury requiring first aid

Table 1.4.5 – ACSO 1200 likelihood and impact criteria table

1.4.472. ACSO 1200 had a safety risk escalation tool which was used to facilitate duty of care, managerial oversight, assurance of risk decision making and risk management by the chain of command. It articulated the level at which risks could be held. If the threshold of a certain risk was scored above the activity owner's level, then the risk would have to be escalated and accepted by the next higher level for the activity to continue as depicted in the risk escalation table shown in table 1.4.6.[152]

Level of Risk	Level at which safety risk must be scrutinised	Level at which Duty Holding Risk to life can be owned and tolerated
Very High (Scoring 25 or more)	4* CGS	Extreme Operational Requirement only – SDH / Defence
High (Scoring 20 or more)	3* Command	ODH[71]
Medium-High (Scoring between 15 and 20)	2* Command	
Medium (Scoring between 10 and 14)	OF5/1* Command	DDH
Low (Scoring between 4 and 9)	OF 4 Commanding Officer	NA – Duty Holding does not apply to low RtL activity - can be held by the CO / OF4
Very Low (Scoring between 1 and 3)	LCpl to OF3 Sub-unit Comd or CI	

Table 1.4.6 – ACSO 1200 risk escalation table

[152] ACSO 1200. Page 80, paragraph 22.

1.4.473. Ex CS's RA showed that the five principal steps as described in JSP 375[153] were followed during the RA process, and a total of 31 hazards were recorded in the RA. Of these hazards, 14 had additional control measures applied to reduce risks to ALARP. This resulted in the RA scores for all 31 hazards ranging between 1 and 6, which in accordance with ACSO 1200 could all be held at CO / OF4[154] level (see table 1.4.6). Exhibit 7 Exhibit 52

1.4.474. None of the hazards identified in the exercise RA pertained to the risks presented by inexperienced student commanders, the risk of dismounts being hit or run over during debussing, the lack of prescribed debussing procedures from FV511, or using FV511 in lieu of an FV510. Nor was there evidence of dynamic RAs being conducted as these issues presented. In the panel's opinion, had they been considered, either individually or aggregated together as a compound / aggregated risk,[155] it was probable that additional control measures would have been put in place to reduce the safety risks further.

1.4.475. The panel **observed** that the 5 x 5 RA impact grid used by RATD, as prescribed in ACSO 1200 offered greater clarity than the 3 x 3 RA impact grid depicted in the MOD Form 5010 (V1.3 07/2020) version, and its use should be seen as best practice.

1.4.476. The panel concluded that the aggregated risk presented by inexperienced student commanders, the risk of dismounts being hit or run over during debussing, the lack of prescribed debussing procedures from FV511, and using FV511s in lieu of FV510s, had not been identified and the aggregated risk was not ALARP. The panel finds this was a **contributory factor**.

1.4.477. **Recommendation. Director of Defence Safety should standardise the risk assessment (RA) process and proformas across defence with a common impact grid, and likelihood and impact criteria table, in order to simplify the RA process and provide a common risk scoring system to ensure risks are held at the appropriate level.**

1.4.478. **Recommendation. Director of Defence Safety should improve risk assessment (RA) training to enhance hazard identification to ensure RAs have tangible outputs that reduce risks to ALARP.**

Ex CS - written instructions

1.4.479. Pam 21 directed that planning officers were responsible for the production of written instructions which proved that they had followed an Exhibit 43 Exhibit 56

[153] JSP 375 Volume 1. Chapter 8, pages 5 to 7, paragraphs 23 to 28.
[154] OF4 is a NATO rank grade descriptor which is equivalent to lieutenant colonel (Army and RM), commander (RN) and wing commander (RAF).
[155] JSP 892 Risk Management Part 2. Page 56. Risk aggregation - Grouping of risks which have a common cause or interdependency and when considered together have a greater impact than when considered separately.

acknowledged planning process, covered all aspects of safety and provided the necessary briefings to all staff and participants. The standard format of written instruction for a blank firing exercise was an EASP, the template of which was located on the BAeBB. EASPs were mandated and must have been countersigned by the SPO. Pam 21 listed the following as subjects likely for inclusion in the written instructions:

a. The conducting officer's responsibilities before, during and after firing.

b. The responsibilities of safety supervisors / exercise assistants specific to each weapon / pyrotechnic employed on the exercise.

c. The responsibilities of all other exercise staff.

d. Describe the rehearsal / walkthrough procedures.

e. Safety briefings for all exercise staff and participating troops.

f. Provide sketch maps, where applicable.

Ex CS's EASP broadly followed the templated EASP found on the BAeBB.

Staff responsibilities

1.4.480. A table at paragraph 4 of the EASP listed the exercise appointments, which consisted of one ECO, two AECOs, three safety supervisors[156] / EAs, one medic and two ammunition NCOs. Of these the ECO, AECO and EAs had specific responsibilities for the safe conduct of the exercise. Their responsibilities were listed in paragraphs 5 and 6 of the EASP. The AECOs and EAs were specifically responsible for the safe conduct involving blank ammunition and pyrotechnics. There were no specified staff responsibilities listed for the supervision of the non-firing aspect of AVs or the students commanding them. Exhibit 7

Safety supervision – blank ammunition and pyrotechnics

1.4.481. Pam 21 stated that there was no set ratio of EAs to exercising troops when using blank ammunition or pyrotechnics. The responsibility lay with the planning officer / ECO to decide based on the standard of the exercising troops. Pam 21 outlined the procedures to be taken prior to use and after use when using blank ammunition but did not describe procedures for supervising troops during use. Exhibit 43

1.4.482. The EAs and AECOs were drawn from the RATD staff. Their duties as EAs were listed in the EASP as, 'To act as enemy forces, to Exhibit 7 Witness 4

[156] Pam 21 listed two appointments that had 'supervisory' roles, a safety supervisor and an exercise assistant (EA). Both roles related to the use of ordinance, munitions, explosives (OME). A safety supervisor's role pertained to live firing and EA responsibilities lay with the safe conduct of those aspects of an exercise involving blank ammunition or pyrotechnics that are allocated to them. Therefore, the use of the term safety supervisor was technically incorrect as it was not a live firing exercise. This point is explored further in the analysis of Pam 21.

monitor and assist with all safety aspects and contribute towards the final debrief conducted by the ECOs.' Whilst not explicit in the EASP, the EAs and AECOs aligned themselves to their specific student / courses, i.e. the armoured instructors to the armoured students and the armoured infantry instructors (of which there was a total of three – ASPO, AECO and the EA1) to the armoured infantry students and OPFOR. In the panel's opinion, given the experience of the exercising troops and relative low risk presented by the use of blank ammunition and pyrotechnics, the safety measures stated in the EASP for the use of blank ammunition and pyrotechnics were reasonable and appropriate.

1.4.483. The panel **observed** that the EASP could have been more explicit in detailing EA responsibilities and who was responsible for supervising each sub-unit with regards to supervision of blank firing.

1.4.484. The panel concluded that safety supervision regarding the use of blank ammunition was adequate and was **not a factor**.

Safety supervision – armoured vehicles (AVs)

1.4.485. During the D&M module, student commanders were supervised by qualified instructors who occupied the Warrior gunner's seat. However, this seat was occupied by a gunner during the tactical phase, which left no place in the vehicle for a safety supervisor to effectively supervise student Warrior commanders. The panel could not find any policy governing the supervision of AV crews / student vehicle commanders during tactical training (unless they were participating in live firing exercises). In circumstances where elements of the safe system of training (SST) were missing or did not fully cover the activity (in this instance a 'safe practice' of supervising AV crews / student commanders), then 'additional hazards shall be added to the risk assessment (MOD Form 5010 or single-service substitute)'.[157] The EASP and exercise RA made some mention of the supervision of AV crews, directing staff (DS)[158] to follow each section and the use of 'real time commanders'.

Exhibit 7
Exhibit 39

Directing staff (DS) to follow each section (Warrior)

1.4.486. One of the hazards identified in the exercise RA (annex D to the EASP) was shown as 'cross country driving – risk of collision or rolling'. One of the existing control measures was listed as 'DS follow each section (Warrior)' and a required action was 'DS to observe movement of vehicles as much as possible throughout'. There was no mention of how to intervene to prevent an accident / incident occurring.

Exhibit 7

1.4.487. There were six section Warriors and two platoon commander Warriors in the armoured infantry company, a total of eight Warriors (see figure 1.4.33). There was a total of three RATD armoured infantry

[157] JSP 375 Volume 1. Chapter 40, page 8 paragraph 42.
[158] DS – Directing Staff (a generic term used to describe course instructors / exercise staff).

instructors, of which one was dedicated to supervising the OPFOR. This left two instructors to 'follow' the six section Warriors (it was only stipulated in the RA that the section Warriors were to be followed – there were also two platoon commander vehicles). The panel found no evidence of an 'existing control measure' for DS to follow each section Warrior either being briefed or contained in the safety briefs. Furthermore, the armoured infantry instructors only had two available staff which was insufficient to monitor six section Warriors – eight including the platoon commanders' FV511s.

1.4.488. There was a method to stop activity in the event of an accident / incident occurring. This was described in the EASP and required someone to shout 'stop, stop, stop' and repeat it over all radio nets. However, there was no method of intervention described in the RA or EASP to prevent an accident / incident as a situation unfolded. Although 'stop, stop, stop' could be used as a preventative measure, there was no guarantee the radio transmission would have been able to override other radio transmissions (see section 5). As explored in section 5 of this report, some of those who witnessed the accident did try to transmit a 'stop, stop, stop' call on the Bowman radio system as the Warrior reversed. Had the 'stop, stop, stop' call been received by the crew of C/S 42A when the witnesses first saw the vehicle starting to reverse, in the panel's opinion, given the speed of the vehicle and allowing for reaction times, it was almost certain that it still would not have stopped in time to prevent the accident.

1.4.489. The panel concluded that the control measure of having DS follow each section as stipulated in the RA was not resourced, nor had the control measure been articulated either verbally or in a written instruction to the exercise staff and therefore was not an effective control measure. The panel found the lack of effective control measures to be **an other factor**.

1.4.490. The panel concluded that there was no effective method of intervention available that could have stopped the Warrior reversing in time to have prevented the accident, and this was **a contributory factor**.

1.4.491. **Recommendation. Deputy Chief of the General Staff should ensure that a system is in place to ensure that activity owners apply the control measures listed in exercise risk assessments (for Army exercises) in order to reduce the risk of incidents / accidents to as low as reasonably practicable (ALARP) and that they remain tolerable.**

1.4.492. **Recommendation. Fleet Commander should ensure that a system is in place to ensure that activity owners apply the control measures listed in exercise risk assessments (for Navy exercises) in order to reduce the risk of incidents / accidents to as low as reasonably practicable (ALARP) and that they remain tolerable.**

1.4.493. **Recommendation. Air and Space Commander should ensure that a system is in place to ensure that activity owners apply the control measures listed in exercise risk assessments (for RAF**

exercises) in order to reduce the risk of incidents / accidents to as low as reasonably practicable (ALARP) and that they remain tolerable.

1.4.494. **Recommendation. Deputy Commander Strategic Command should ensure that a system is in place to ensure that activity owners apply the control measures listed in exercise risk assessments (for Strategic Command exercises) in order to reduce the risk of incidents / accidents to as low as reasonably practicable (ALARP) and that they remain tolerable.**

1.4.495. **A recommendation has already been made at paragraph 1.4.378, that the Deputy Chief of the General Staff should devise and implement an effective method of intervention to enable exercise staff to rapidly stop armoured vehicle movement in order to reduce the risk of accidents occurring during exercises.**

Real time commanders

1.4.496. There were several references to 'real time commanders' in the EASP. Exhibit 7

a. The AFV safety brief (annex E to the EASP) stated:

(1) 'The real time commander has ultimate authority and responsibility for the AFV and crew. He will intervene on safety points only. The student will otherwise command.' (Page E – 2, paragraph 13).

(2) 'Real time Commanders must remain opened up at all times except when crossing bridges.' (Page E – 3, paragraph 41). This was listed as a CR2 specific point.

b. In the 'safety organisation' section of the exercise RA (annex D to the EASP), it stated: 'Directing Staff and Real Time Commanders will supervise safety.' (Page D – 18, paragraph 3). It also had the use of 'real time commanders' as control measures for nine of the hazards identified in the RA, of these, one was Warrior specific, four were CR2 specific and four were general hazards.

The EASP did not define who the real time commanders were, what qualifications were required, or list their roles and responsibilities.

1.4.497. The panel could find no references to 'real time commanders' in the publications that govern the operation and training with AVs (AVSOs, Pam 21, Mounted Close Combat – Volume 1 Individual Training pamphlet and Mounted Close Combat Turret Weapons and Equipment – 30mm Warrior pamphlet). During the course of the investigation, those interviewed gave differing views on their interpretation of their understanding of the term 'real time commanders'. The interpretation fell into three brackets: Exhibit 20 Exhibit 43 Exhibit 54 Exhibit 57

accountability for the vehicle, ultimate responsibility as the commander, and a supervisory role.

1.4.498. The planning officer / ECO's understanding of 'real time commanders' was that they were only used in CR2 and not Warrior. Also, they were someone who was qualified and sat in the vehicle's turret alongside the students to mentor them and be responsible for the overall safety of that vehicle. These points were not reflected in the EASP. Exhibit 7 Witness 3

1.4.499. At the time of the accident, a fully qualified and competent commander had not been appointed as a 'real time commander' in C/S 42A. Had one been appointed, the only viable position for them to occupy, was the gunner's seat. Their primary purpose in this position would have been to act as a gunner, not as a safety supervisor. Even if they were not employed as a gunner, they would have not been able to see what the commander could see and, therefore, would still not have been in a position to intervene due to a lack of situational awareness. This differed from a CR2 where there was a seat in the turret, normally occupied by the operator, which was utilised for real time commanders. In these circumstances, the real time commander's sole role could be supervising the student commander. Furthermore, someone employed to 'supervise' must have defined roles and responsibilities, and be competent to do so. Witness 3

1.4.500. The panel concluded that the informal use of personnel as 'real time commanders' as described in the RA did not translate into formal direction to the exercise staff, students or SET troops. Furthermore, there was a lack of defined roles and responsibilities for 'real time commanders' which is likely to have created some confusion during Ex CS as to who fulfilled the AV commander responsibilities as defined in AVSOs (i.e. real time commander or student commander). The panel found that the confusion surrounding the use of 'real time commanders' was **an other factor**.

1.4.501. The panel **observed** that it was unlikely that the outcome would have been different had there been a fully qualified and competent commander appointed as a 'real time commander' in C/S 42A at the time of the accident, due to the limited and differing fields of view to the student commander, a lack of defined responsibilities and lack of training as a supervisor.

1.4.502. **Recommendation. Director Land Warfare should clarify the use of 'real time commanders' during the training of armoured vehicle (AV) commanders, and either formalise the role or dispense with its informal use, in order to ensure it is clear where AV commander and safety supervision responsibilities lie.**

Ex CS - safety brief

1.4.503. The EASP contained three safety briefs. One for the exercise staff and one for the exercising troops in the main document, and an AFV safety brief at annex E. There was also an annex titled 'Safe Handling of Pyrotechnics' at annex C. The staff and exercise troops safety briefs covered the same points that pertained to: Exhibit 7

a. Actions on the command 'stop, stop, stop'.

b. Actions to be carried out if an accident were to occur.

c. Weapon and ammunition safety points.

d. Actions on the outbreak of a fire.

e. Medical plan.

1.4.504. D Company 2IC recalled reading the safety brief (including the AFV safety brief) verbatim to D Company personnel before they deployed to the exercise area. The ASPO gave the safety brief to the students at the start of the exercise. Witness 34 Witness 35 Witness 48

1.4.505. The safety brief for the exercising troops in the main body of the EASP for the conduct of the exercise, followed the format from the template on the BAeBB and was in line with the direction given in Pam 21. The text in the EASP indicated a 'full brief' was at annex D to the EASP, this was incorrect as annex D was the exercise RA, not a safety brief. Exhibit 7 Exhibit 43

1.4.506. The following points were noted regarding the AFV safety brief (annex E to the EASP): Exhibit 7

a. Paragraph 7 stated, 'All crews are to…practice turret drop down drills[159] under instruction of the veh comd prior to leaving the Rookery on D Day [day 1 of the exercise].' The panel found no evidence to suggest crews practised drop down drills as stated. This led the panel to believe that not all elements of the brief were briefed or enforced.

b. Paragraph 13 stated, 'The real time commander has ultimate authority and responsibility for the AFV and crew. He will intervene on safety points only. The student will otherwise command.' Real time commanders are covered in paragraphs 1.4.496 to 1.4.501 of this report.

c. Paragraph 17 stated, 'The Comd is responsible for carrying out a 360-degree check of the AFV prior to moving off, checking

[159] Drop down drills are conducted if a vehicle is about to roll over and mitigate the risk of injury to the crew. They involve dropping into the vehicle and bracing up.

stowage, security of hatches and that no equipment has been left on the ground.' It is not clear if this meant moving off after a long halt or after debussing troops. Either way, in order for a commander to check those items listed, they would physically need to have dismounted from the vehicle. In the panel's opinion this was unrealistic and highlighted that some of the direction given in the safety brief was unachievable.

d. Paragraph 21 stated, 'Always check behind an AFV before you order your dvr to reverse'. In the panel's opinion, this was an ambiguous statement and was unclear as to what the commander was to check. A blind spot analysis was conducted by ATDU in support of this service inquiry. The analysis identified that a 'closed down' FV511 commander in similar conditions to when the accident occurred, had a blind spot that extended 14.2m behind the Warrior (see figure 1.4.36). Therefore, there was no certainty that it was safe to order the driver to reverse even though the commander had checked to the rear of the Warrior and no persons were visible to them.

Exhibit 111

Figure 1.4.36 – Warrior commander's rear 'blind spot'

e. Paragraph 22 stated, 'When dismounting troops, the correct drill is to be applied, no WR [Warrior] will reverse until the WR commander has received the all clear thumbs up from the dismount commander. Vehicle Comds must ensure back door is closed before moving off'. Of the three elements in this statement (drills, thumbs up signal and closed back door), none were applicable in this accident for the following reasons:

(1) There was no prescribed 'correct drill' to debus from an FV511.

Exhibit 59

(2) The 'all clear thumbs up' was only part of a recognised procedure when debussing from an FV510.

Exhibit 58

(3) There was a fault with the function of the rear door open lamp and the rear door alarm. Therefore, the driver or commander had no way of knowing if the rear door was open or closed. Due to the tactical situation, it was not feasible for the FV511 commander to physically check if the rear door was closed. Exhibit 44

f. Paragraph 23 stated, 'If any Comd is unaware of his dismounts position, he is to stay firm until he is certain of safe manoeuvre.' In the panel's opinion, had this direction been adhered to, it is unlikely the commander would have ordered the driver to reverse. However, as part of the inquiry, a trial was undertaken by the ATDU to determine a Warrior commander's field of view when 'closed down'. The diagram at figure 1.4.37 is taken from the trial report and shows the limited fields of view through a Warrior commander's periscopes. In the panel's opinion, based on the extent of the areas that cannot be seen by the commander surrounding a Warrior (which extend out to 21m) it was unlikely that a Warrior commander could have been certain of dismounted troop positions when operating 'closed down'. Exhibit 111

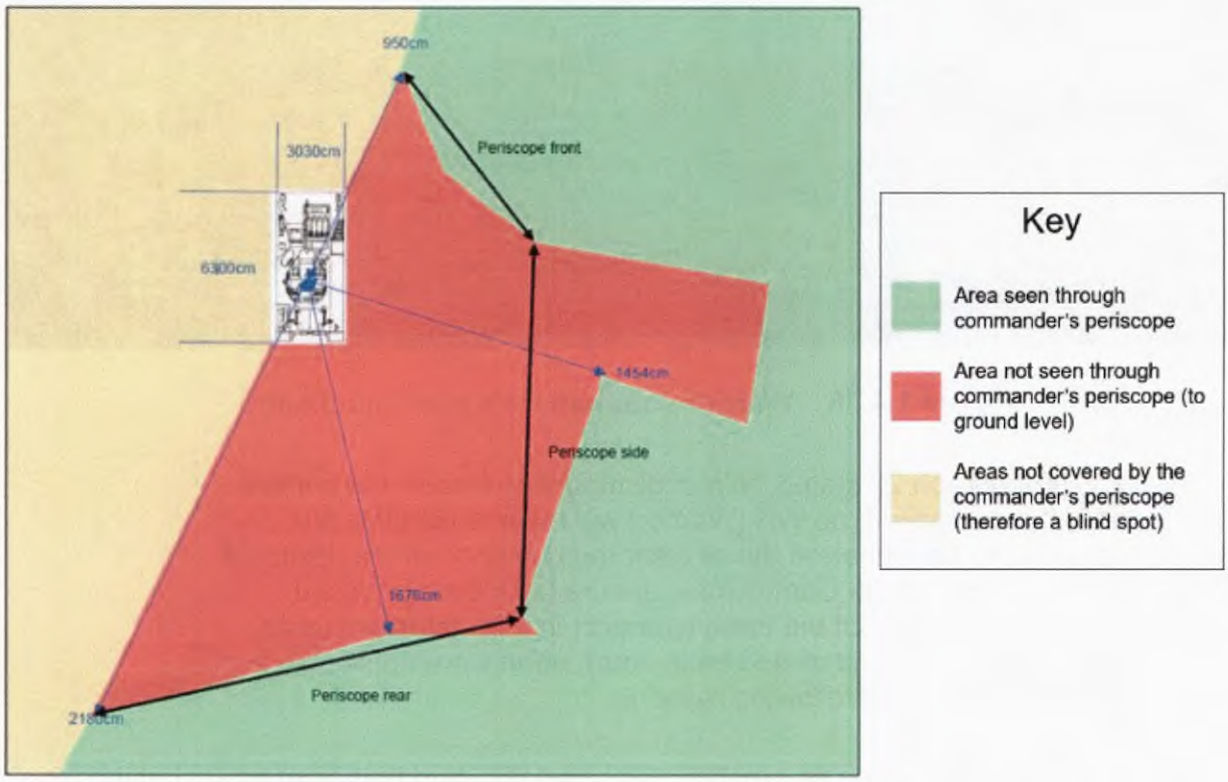


Figure 1.4.37 – Warrior commander's field of view (closed down)

1.4.507. The panel concluded that the safety briefs for the exercise staff and exercising troops, which were contained in the EASP main document,

were adequate for the blank firing aspect of the exercise and post incident management and were **not a factor**.

1.4.508. The panel **observed** that several points in the AFV safety brief were either ambiguous or unachievable.

Ex CS - medical plan

1.4.509. In accordance with SPTA RSOs, for exercises conducted on SPTA, the responsibility for the medical plan lay with the planning officer. This was in line with the direction in Pam 21 that stated the planning officer / ECO was responsible for ensuring the correct medical cover. Pam 21 also stated the minimum medical requirement for blank firing exercises, which equated to a basic trained first aider, first aid kit, stretcher, safety vehicle and communications to the emergency services. Exhibit 12 Exhibit 43

1.4.510. The Ex CS admin instruction stated that the medical cover would be provided by the SET troops. It directed 'each sub unit should provide 1 x medic'. It did not specify the qualification the medics should have had, nor did it specify the required capabilities of the safety vehicle / ambulance (i.e. wheeled or tracked). Exhibit 1

1.4.511. Ex CS's medical appointments were stated in paragraph 4 of the EASP. It listed all students and SET troops, and a corporal CMT1. It listed the qualifications held and showed a tracked ambulance next to the CMT1. Exhibit 7

1.4.512. Ex CS's medical plan was articulated in the EASP. It stated, 'a safety vehicle with stretcher and a first aid kit will be at the central admin area command post (CP) or following the exercise and manned at all times'. Actions in the event of a casualty and the immediate action to be taken were contained in the EASP's main document and twice in annex B to the EASP. Exhibit 7

1.4.513. The level of medical cover for Ex CS (two CMTs, each in a Bulldog ambulance) exceeded the minimum requirement as stipulated by Pam 21. The medical sections in the main document of Ex CS's EASP met the basic requirements as stipulated in Pam 21 and the format mirrored the EASP template which was available on the BAeBB. However, the panel did find some anomalies during the examination of the EASP. Exhibit 43 Exhibit 56

a. **Repetition**. The repetition of the IA and action on casualties required the reader to read three sections of the document to determine what action to carry out (EASP main document, annex B and the SPTA flow chart in annex B). All three sections varied to some extent with different actions and telephone numbers being listed and detailed. One consolidated and coherent medical plan would have made it easier to read and to understand what actions to take in the event of a casualty. Exhibit 7 Exhibit 12

b. **Plan**. The EASP lacked a detailed plan of how the medical assets were to be co-ordinated to ensure medical planning guidelines for the treatment of casualties could be met. It only stated that the CMT 'can administer further treatment' and for minor casualties 'will assist with first aid as required'. It was not explicit that a CMT was to be summoned in the event of a casualty. There was no communications plan in the EASP that provided details of how to contact a CMT if required. Nor did the EASP direct exercise staff to be issued with a mobile phone to call the emergency services if required. The lack of a communications plan was particularly pertinent due to the force elements being constantly mobile and dispersed over a large area (an armoured squadron and armoured infantry company could expect to be spread over 32 square kilometres during an advance to contact – see serial 4 and 5 in table 1.4.7).[160]

Exhibit 7
Exhibit 112

Ser	Fmn/ unit/ subunit	Defence		Delay		Adv to contact		Attack width	Assy area (km²)	Assy area[1] (km²)
		Width (km)	Depth (km)	Width (km)	Depth (km)	Width (km)	Depth (km)			
1	Armd Div[2]	30	60[3]	30	20[21]	20–32[23]	80	15	150	600[4] 900[5]
2	Armd Inf Bde[6]	15	25[7]	15[19]	20[18]	10–16[22]	40	7	30	250[8]
3	Armd Inf BG	5	4	5[15]	10–15[15]	5–8	10-15	1–2[11]	5	25
4	Armd Sqn	1.5–2[10]	3[10]	5	10–15	5–8	4	1[9]	1	2
5	Armd Inf Coy	1.75	2	5	10–15	2.5–4	4	1[12]	1	2
6	Mech Inf BG	2.5[16]	4[16]	NA	NA	5–8	10-15	0.5[11]	5	25
7	Mech Inf Coy	1.25[17]	1.5[17]	NA	NA	2.5–4	4	0.25[13]	1	2
8	LR Inf BG	3	4	NA	NA	(1)	(5)	0.5	3	10
9	LR Inf Coy	1.25	1.5	NA	NA	(0.5)	(1)	0.25	0.25	1

Table 1.4.7 – Unit real estate yardsticks

c. **Medical appointments**. Pam 21 specified those nominated as medics were not to be employed in any other role that might result in them becoming a casualty or prevent them reacting to accidents.[161] The EASP had included all students and SET troops in the medical appointment list, which was against the direction given in Pam 21, as they themselves may have become casualties, or would have been undertaking duties that may have prevented them from reacting to accidents. The panel understood the intent, i.e. all exercise personnel had a responsibility to provide first aid

Exhibit 43

[160] The Staff Officers Handbook 2018 (AC71038). Page 2.3_3, paragraph 2.28. Viewed 31 January 2023.
[161] Pam 21 (2022). Page 2-18, paragraph 2-42, note 2.

should they encounter a casualty. However, they should not have been 'appointed' in the medical section of the EASP.

1.4.514. The panel concluded that the level of medical cover was appropriate for Ex CS and exceeded the minimum requirements as laid out in Pam 21 and was **not a factor**.

1.4.515. The panel **observed** that the medical plan was adequate. However, its effectiveness was reduced due to inconsistencies, lack of clarity, repetitiveness and lack of key information, notably a communications plan.

1.4.516. The panel **observed** that students and SET troops should not have been listed in the medical appointment of the EASP as this contradicted the direction given in Pam 21.

Senior planning officer (SPO) check

1.4.517. To ensure compliance with the safe system of work, Pam 21 stated that the SPO was to supervise and give guidance for the planning and conduct of activities. It also provided a check list for the SPO to confirm that various actions had been completed prior to the start of an exercise. Exhibit 43

1.4.518. The SPO for Ex CS was the RATD's SO2 Recce. Ordinarily the role would have fallen to RATD's chief instructor, but that post was gapped. SO2 Recce was appointed as the SPO as they met the criteria as laid down in Pam 21. Other than conducting the SPO check, the SPO had no other role in the delivery of the AIPCC Tactics module or Ex CS. Witness 2

1.4.519. The SPO indicated that the EASPs from previous exercises were used as a template for the subsequent exercise. Each iteration was modified to incorporate lessons identified from the previous exercises, or to incorporate changes brought about by new policy or requirements from safety notices. Witness 2

1.4.520. The SPO had formed the opinion that the EASP was already in a good state based on examinations of EASPs for previous iterations of Ex CS. For this reason, the focus of the SPO's check of Ex CS's EASP was on the staff work (i.e. it was 'proofread'),[162] it was not a detailed examination of the plan.

1.4.521. In the panel's opinion, had a more thorough check of the EASP occurred, some of the anomalies with it may have been identified and addressed. For example, the panel identified that the EASP lacked clear staff responsibilities and that the medical plan was not clear, concise and Exhibit 7 Witness 2

[162] https://dictionary.cambridge.org/dictionary/english/proofread. Accessed 27 January 2023. Proofread: To find and correct mistakes in text before it is printed or put online.

consistent. There were also anomalies with the RA that were not identified. For example, the control measure that required 'DS to follow each Wr [Warrior]', could not have been implemented as it would have required 8 to 14 staff (depending on how many Warriors were on the exercise), when only two staff were available.

1.4.522. Pam 21 also stated, 'If there are insufficient resources or manpower concerns, in particular, qualified or authorised safety staff or competent exercising troops, the SPO is to refer the matter back to the exercise director for a decision.' Although resourcing issues were identified, the decision to continue with the exercise was made without these issues being formally raised to the SPO. The resourcing issues were instead left to a more junior officer to resolve. Exhibit 43

1.4.523. The panel **observed** that insufficient emphasis was placed on the SPO's role and responsibilities. This led to resourcing issues not being effectively addressed, and anomalies with staff responsibilities, the medical plan and the risk assessment in the exercise action safety plan not being identified and addressed.

Ex CS – conduct

Preliminary activity - 14 June 2022 (day 1)

1.4.524. D Company, RATD exercise staff and the Ex CS students rendezvoused on 14 June 2022 at The Rookery on SPTA near Warminster. They conducted preliminary activity, which included, the exercise safety briefs to the students delivered by the ECO, and students integrating into their nominated vehicles. Exhibit 1 Witness 3

Warrior commander's handover / takeover (HOTO) procedure

1.4.525. Throughout Ex CS, student commanders changed vehicles depending on the role they had been appointed to for the day's activities. This was a daily occurrence for some of the student commanders. When nominated as platoon commanders, the student was assigned to an FV511 which was used in lieu of an FV510.

1.4.526. AVSOs listed the minimum requirement when conducting the HOTO of equipment on exercises. It stated that both crews (complete) were to be present, relevant maintenance was to be conducted, and the commander taking over was to be satisfied that the equipment was complete and safe to operate. Exhibit 20

1.4.527. The panel found no evidence of a formal HOTO procedure when the student commanders assumed command of their vehicles during Ex CS, or formal procedure for integrating the student commander with the Exhibit 20

crew. Nor did the panel find a formal method, in AVSOs, or the Warrior AESPs, for commanders to record their takeover of an AV.

1.4.528. During Ex CS student commanders did not sign the ATUD for their vehicle on assuming command, a requirement that was directed in the 5 RIFLES UECD.[163] Whilst an AV commander's signature denoted who the commander of the vehicle was for the period stated on the ATUD, the purpose of the commander's signature was not defined in policy or regulations, unlike the driver's signatures, which were.

Exhibit 70
Exhibit 71
Exhibit 72
Witness 34

1.4.529. The lack of a formal vehicle HOTO by student commanders, and them not signing the ATUD, demonstrated that commanders were not fulfilling their responsibilities as laid out in AVSOs. Nor was the direction in the 5 RIFLES UECD being adhered to or enforced by the SET troops' chain of command.

Exhibit 20
Exhibit 70

1.4.530. Without a formal HOTO procedure, there was no system for the incoming commander to assure themselves that their vehicle was serviceable or for them to familiarise themselves with existing faults and limitations that the vehicle may have had.

1.4.531. The panel was unable to determine if the fault relating to the rear door alarm and rear door open lamp that existed on C/S 42A (see section 5) would have been evident to the incoming student commander even if a formal HOTO procedure was in place, as the fault had been sentenced as a 'fully fit' fault and was not listed on the ATUD.

1.4.532. The panel concluded that the lack of a formal HOTO procedure degraded student commanders' awareness of vehicle issues / faults which presented a risk to the safe operation of Warrior. The panel finds that the lack of a formal vehicle HOTO procedure was **an other factor**.

1.4.533. **Recommendation. Director Land Warfare should ensure that hand over / take over procedure of armoured vehicles as described in Armoured Vehicle Standing Orders is formalised and recorded by the vehicle commander. This is to ensure that all crew members are fully apprised of their vehicle's faults and limitations prior to its use and to the commander assuming command of the vehicle.**

1.4.534. **Recommendation. Head Policy, Assurance and Compliance, Joint Support should clarify the purpose of the commander's signature on armoured vehicle authority to use documents in order to clarify responsibilities.**

[163] On AV's ATUDs there is a signature block for the vehicle commander to sign as well as the drivers, whereas on a B class vehicle's (non-armoured vehicles) ATUD only the driver is required to sign the ATUD.

Vehicle commander responsibilities

1.4.535. The vehicle command element had been taught during the D&M module which qualified the student commanders to command Warrior on 'point-to-point' moves, but not tactically. Until the completion of the tactics phase, the status of the student commanders in accordance with AVSOs was not 'fully competent'. Exhibit 20

1.4.536. AVSOs stated, 'The AV Commander is responsible for the operation of the vehicle, the safety of its crew (including associated dismounts), its equipment and all other passengers'. AVSOs did not distinguish between a student AV commander and a fully competent AV commander regarding the AV commander responsibilities. Exhibit 20

1.4.537. The AV commander responsibilities were listed in AVSOs and Warrior commander specific responsibilities were contained in the FV510 operating information AESP (2350-T-201-201). One such responsibility was to ensure 'all troops are familiar with, and have practiced, the debussing / embussing procedure prior to any deployment in a Warrior vehicle.'[164] Exhibit 20 Exhibit 58

1.4.538. In the panel's opinion it would have been reasonable to expect a student commander to be sufficiently competent on completion of the D&M module to fulfil those AV commander responsibilities that did not involve tactical actions. Had there not been a training deficiency it would have also been reasonable for them to be able to debus troops from an FV510, although not from an FV511 as there was no prescribed procedure.

1.4.539. Warrior commanders and SET troops allocation to vehicles constantly changed during Ex CS. This, combined with a lack of 'formal' HOTO would likely have denied student commanders sufficient time to satisfy themselves that all safety measures were in place. Due to the training deficiency and lack of prescribed procedure for the FV511, they were very likely to have lacked sufficient knowledge and experience to competently familiarise and practice their dismounts in debussing.

1.4.540. In the panel's opinion, until such a point that an AV commander was deemed 'fully competent', they could not reasonably be expected to fulfil the responsibilities of an AV commander sufficiently to ensure the safe operation of the vehicle and the safety of its crew and passengers during a tactical exercise. In such circumstances, it would have been reasonable to expect a degree of supervision to ensure the AV was safely operated during the tactical actions (such as debussing). Such supervision was not in place (see paragraphs 1.4.485 to 1.4.490).

1.4.541. The panel concluded that, as defined by JSP 375, the student commanders were not 'safe persons', and, therefore, were not competent

[164] Army Equipment Support Publication 2350-T-201-201, Combat Vehicle, Personnel, Tracked, 30mm Gun Warrior Bowman FV510, Operating Information. Chapter 3-10, page 2, paragraph 4.3. This did not appear in the FV511's operating AESP as there was no debussing procedures listed for the FV511.

to fulfil the responsibilities of an AV commander during the tactical phase of the AIPCC. The panel further concluded that there was inadequate supervision to ensure the safe operation of the Warrior and the safety of the crew and passengers. The panel finds that the competence level of the student commanders and the associated lack of supervision was a **contributory factor**.

1.4.542. **A recommendation has already been made at paragraph 1.4.246, that the Director Land Warfare should ensure that student armoured vehicle (AV) commanders are adequately supervised during tactical exercises to ensure the safe operation of AVs and the safety of the crew, passengers and exercising troops.**

Initial phase - 15 to 17 June 2022 (days 2 to 4)

1.4.543. The initial phase of the exercise focused on low-level tactics, progressing from platoon to company level actions with armoured support. Witness 36

Student competency

1.4.544. Students reported that the pace of the exercise was progressive and that the instructors were extremely professional and had a mature approach. Some students articulated the challenges of commanding Warrior tactically compared to commanding during the non-tactical D&M phase. Some had the opinion that more time should have been allocated to the tactics phase to allow them to consolidate their skill set and ensure that they were sufficiently competent to deal with the increased challenges and complexities as the phase progressed. Some of the concerns raised by students regarding competency were highlighted during the initial phase of Ex CS, when two minor collisions occurred, both involving Warriors commanded by students. In the opinion of one of the students involved, the cause of the collisions was attributed to a lack of experience. Exhibit 89 Witness 34 Witness 39

1.4.545. The demands on the student commanders' proficiency as Warrior commanders increased significantly with the step change between the D&M module and the tactics phase. This was exacerbated on this AIPCC due to the training deficiencies from the D&M module (debussing and operating 'closed down'). In the panel's opinion, despite the best efforts of the RATD staff, students were not afforded sufficient opportunities to master the low-level TTPs involving dismounts and close the competency gaps during the tactics phase. This was due to a lack of programmed time, lack of resources (instructors) and the need to meet the tactical phase TOs. This presented an increased risk to life which persisted throughout the exercise.

1.4.546. The panel concluded that student commanders lacked competency in some low-level TTPs due to training deficiencies from the D&M module which the RATD staff were unable to address during the tactics phase due to programming and a lack of time and resources. This

created an increased risk to life when the students conducted the more challenging and complex training during the AIPCC Tactics module. The panel finds that student competence gap at the start of Ex CS was not closed and persisted throughout the exercise, presenting an increased risk to life and this was **an other factor**.

1.4.547. **Recommendation. Director Land Warfare should assure that student Warrior commanders demonstrate that they are sufficiently competent to command Warrior and conduct individual vehicle tactics, techniques and procedures involving dismounts prior to progressing to the platoon and company level tactical actions.**

Debussing demonstration

1.4.548. On the second day of the exercise, a demonstration of a section debussing from an FV510 was conducted to remind exercising troops of the key safety points, prior to them undertaking their first tactical actions. An AIPCC student reported that this was the first time during the AIPCC that they had seen a full run through of the procedure (nine days from the end of the three-month course). Following the demonstration students undertook their first tactical actions. For some student commanders this involved debussing troops, however, each student commander was not systematically practiced and assessed in the procedure. Witness 39

1.4.549. The risk of incidents involving dismounted personnel and AV increases during the debussing procedure which highlights the reason for the RATD staff to have conducted the debussing demonstration. However, the fact the student commanders had never seen a full demonstration of the debussing procedure or conducted the full procedure themselves, highlights the additional risk being carried forward into the tactics phase.

1.4.550. The panel **observed** that the RATD staff's insertion of a demonstration of the debussing procedure at the start of Ex CS was appropriate and mitigated some of the risk presented by the student commanders' debussing training deficiency.

1.4.551. The panel concluded that the risk to life remained high despite exercising troops receiving a debussing demonstration at the start of Ex CS due to students and SET troops not being systematically practised and assessed in the debussing procedure prior to undertaking tactical activity. The panel finds that despite receiving a debussing demonstration, the lack of systematic training, practice and assessment of the procedure was a **contributory factor**.

1.4.552. **A recommendation has already been made at paragraph 1.4.547, that the Director Land Warfare should assure that student Warrior commanders demonstrate that they are sufficiently competent to command Warrior and conduct individual vehicle**

tactics, techniques and procedures involving dismounts prior to progressing to the platoon and company level tactical actions.

SET troop competency

1.4.553. Concerns were raised by the SET troops' chain of command, the RATD instructors and some students, regarding the SET troops' lack of competence of operating with Warrior. Some student commanders reported being told by SET troops that they had never previously operated from a Warrior. These concerns were further highlighted when a near miss occurred, which involved a dismounted soldier taking cover to the rear of a Warrior. One instructor made the observation that the SET troops' armoured infantry competence had declined over the previous two years and those who were supporting this Ex CS more so than others. Such was the concern, that the exercise staff stopped the exercise and reminded the exercising troops of the specific dangers of operating with AVs in order to address the shortfalls. Witness 3 Witness 6 Witness 13 Witness 39

1.4.554. D Company's tasks preceding Ex CS had predominantly been in dismounted roles. They had had little exposure to operating in their AVs and almost no time spent operating as an armoured infantry company in the previous two years. Also, the panel found no evidence of D Company completing the armoured infantry BCS. The BCS syllabus was designed to meet the annual special-to-arm training requirements needed to achieve and maintain sub-unit or unit competence. In the panel's opinion, D Company's lack of recent AV and armoured infantry experience had severely degraded their competence to operate safely as an armoured infantry company. This was further exacerbated by not completing BCS to level CHARLIE (company level). Exhibit 81 Witness 11

1.4.555. The panel concluded that D Company lacked sufficient armoured infantry competence to safely support Ex CS. A finding has previously been made at paragraph 1.4.101.

1.4.556. The panel **observed** that the action taken by the exercise staff and the SET troops' chain of command following the near miss involving a dismounted soldier was dynamic, appropriate and mitigated some risk presented by the inexperience of the exercising troops.

1.4.557. **A recommendation has already been made at paragraph 1.4.91, that the Chief of Staff Field Army should ensure that force elements participating in Warrior commander qualifying course tactical exercises are qualified, current and competent for the role that they are being employed and with the equipment being used, to ensure there is a safe system of work and that risks are as low as reasonably practicable (ALARP) and tolerable.**

Maintenance day - 18 June 2022 (day 5)

1.4.558. On 18 June 2022 the course entered Copehill Down Village, a purpose-built urban operations training facility on SPTA. The day was dedicated to vehicle maintenance, enforced rest for the vehicle crews and periods of instruction for the students. The students also received an after-action review (AAR) and were briefed on the salient learning points from the previous four days' actions.

Exhibit 1
Exhibit 2
Witness 3

Second phase - 19 and 20 June 2022 (days 6 and 7)

1.4.559. The exercise increased in complexity following the maintenance day. The armoured and armoured infantry elements combined to form a combined arms company. They conducted urban attacks in the Copehill Down Village and in Imber Village (an urban operations training facility on SPTA). On completion of the urban phase the company conducted a number of actions, including an obstacle-crossing, advance to contact and an attack. Also during this phase, two AIPCC students from a previous course joined to complete tactical serials that they missed during their original course. Throughout, exercise staff continued to give feedback to student commanders and raised pertinent safety points when required.

Exhibit 1
Exhibit 2
Witness 3

Previous evening (20 June 2022)

1.4.560. On completion of the tactical actions on 20 June 2022, the company moved into hides at Halfmoon Copse. Hides were established by 19:00.

Exhibit 2
Witness 11
Witness 13

Vehicle running checks – after use

1.4.561. Once the hides had been established, vehicle crews conducted 'after use' checks on their vehicles. Driver 1 recalled conducting the 'after use' check on C/S 42A, however, this was not logged in the vehicle's documentation.

Exhibit 72
Witness 32

1.4.562. The 5 RIFLES UECD stated that 'before use' and 'after use' checks (commonly referred to as first and last parades) should have been recorded on a 'vehicle before use and after use checks form' (annex B to chapter 9 of the UECD), which formed part of the vehicle documentation retained with the vehicle.

Exhibit 70

1.4.563. In the panel's experience it was not uncommon for 'before' and 'after use' checks to be conducted but not logged, and the absence of a signature did not mean the checks had or had not been conducted.

1.4.564. The panel **observed** that the lack of recording of 'before' and 'after use' checks in the vehicle documentation highlighted an apparent

lack of adherence to the direction in the UECD, but assessed it was likely the checks were actually conducted.

Night routine / driver's hours

1.4.565. During the evening prior to the accident there was no planned activity for exercising troops, other than sentry routines and monitoring radio nets. Those questioned confirmed that drivers were rested, and student commanders were also rested (apart from approximately two hours of radio monitoring each throughout the night). Students indicated that they were getting sufficient rest during the evenings, more so than other courses they had attended. The SET troop chain of command reported monitoring drivers' hours to ensure they were not exceeded, although no records were produced for Driver 1. Witness 32 Witness 35

1.4.566. Although driver hours records were not produced for Driver 1, the panel assessed the routine during the night was relaxed and all exercise participants were well rested the night before the accident.

2Lt George - Ex CAMBRIAN PATROL training

1.4.567. During the evening of 20 June 2022, 2Lt George took part in a training serial in preparation for the forthcoming Ex CAMBRIAN PATROL. The training was led by Platoon Commander 1. Witness 11 Witness 12

1.4.568. This activity was not an Ex CS activity. It consisted of navigational and low intensity physical training. The training serial finished at approximately 23:00 and there was no other activity for the participants until reveille at 05:00 the following morning. The panel opined that the six hours 'rest' between activities was sufficient (and normal for tactical exercises), and that 2Lt George would not have been unduly fatigued. Therefore, this would have unlikely impacted on their performance and judgement the following day.

1.4.569. The panel concluded that fatigue did not play a part in the accident and was **not a factor**.

Accident events

Reveille

1.4.570. Reveille was at 05:00 on 21 June 2022. Prior to moving off, personnel conducted personal administration, vehicle 'before use' checks were conducted, and student commanders integrated with the crew of their allocated vehicles. Witness 22

C/S 42A – crew

1.4.571. Student Commander 1 was nominated as the platoon commander on the evening of 20 June 2022 and was allocated C/S 42A as the platoon commander's vehicle. Student Commander 1 physically assumed command of the vehicle at reveille on the 21 June 2022. Driver 1 had been the driver of C/S 42A throughout the exercise and Gunner 1 assumed the role as gunner shortly after the exercise commenced. Witness 35

1.4.572. There were two people in the rear of C/S 42A, 2Lt George who was acting as the platoon sergeant and could debus and operate dismounted if required, and Dismount 1. Dismount 1 was less clear about their own role and assumed that they were there to support 2Lt George in a dismounted role if required. This differed from Student Commander 1's understanding who assumed Dismount 1 was the deputy vehicle commander (DVC) who would assume command of the vehicle should the platoon commander / vehicle commander need to dismount from the vehicle and operate on foot. Dismount 1's qualifications are explored in the section 3, but it is worth noting that they had not completed an armoured infantry tactics course, nor had they been granted dispensation to command Warrior tactically. Accordingly, they were not qualified to command C/S 42A tactically if required to do so. The exercise staff and SET troops chain of command were not aware there were dismounts / personnel in the rear of C/S 42A. Exhibit 20 Witness 6 Witness 11 Witness 13 Witness 16 Witness 22 Witness 32 Witness 35

1.4.573. Student commander appointments were directed by the exercise staff, however, there appeared to be no rigid control over the appointing of the SET troops. This was highlighted by the ambiguity surrounding Dismount 1's role in C/S 42A and the general lack of awareness that Dismount 1 was not qualified to command Warrior tactically. It was reasonable to expect the student platoon commanders to have a degree of autonomy in assigning roles to the personnel within the platoons they were commanding. However, there did not appear to be a control mechanism between the RATD staff, SET troops and student commanders, to ensure personnel were not employed in a role for which they were not qualified.

1.4.574. The panel concluded that the command relationships, accountability, and lines of responsibility between the exercise staff, SET troops and student commanders were unclear and not fully understood. This led to some troops not fully understanding their role, and on occasions being employed in a role for which they were not qualified. The panel finds that the unclear command relationships and lines of responsibility during Ex CS were **an other factor**.

1.4.575. **Recommendation. Director Land Warfare should ensure that roles and responsibilities are clearly articulated in exercise action safety plans to ensure all force elements participating in exercises fully understand their role and are not tasked to fulfil a role for which they are not qualified or authorised.**

C/S 42A – vehicle running checks – before use

1.4.576. Driver 1 recalled conducting a 'before use' check on C/S 42A prior to moving off on the morning of 21 June 2022. They did not detect, nor were they aware of the fault relating to the rear door alarm and rear door open lamp. It was their understanding that FV511s did not have rear door alarms as troops did not debus from FV511s. This was a common misunderstanding amongst the Warrior crews. Student Commander 1 was also unaware of the fault and was unsure if FV511s had a rear door alarm. Witness 32 Witness 35

1.4.577. The rear door alarm was retrofitted to Warriors following previous reversing accidents to ensure the risk of reversing accidents was ALARP (see the equipment section of this report). However, the check of the operation of the rear door alarm did not feature as part of the 'before use' check as listed in the Warrior maintenance schedule (AESP 2350-T-200-601) (this has subsequently been amended to ensure the operation of the rear door alarm is checked as part of the 'before use' check). Accordingly, the crew did not check the function of the rear door alarm. This resulted in the crew, including Student Commander 1, not being aware of the fault with the rear door alarm, which was an essential safety measure and a key mitigation to prevent a reversing accident. Exhibit 69

1.4.578. The panel concluded that the rear door alarm was an essential safety measure and a check to ensure it functioned should have been introduced as part of the 'before use' check when it was retrofitted to ensure the risk of reversing accidents was ALARP. As the crew of C/S 42A was not required to check the operation of the rear door alarm during 'before use' checks, a key mitigation to prevent a reversing related accident was absent. The panel finds that the omission of a check of the functioning of the rear door alarm in the 'before use' check, and the subsequent restriction on usage of the vehicle was a **contributory factor**.

1.4.579. **Recommendation. Director Land Equipment should ensure that the Warrior rear door alarm is checked as part of the 'before use' check, and direct that passengers are not carried in the rear of the vehicle if there is a fault with the alarm to reduce the risk of reversing related incidents to as low as reasonably practicable (ALARP).**[165]

Order of battle (ORBAT)[166]

1.4.580. Due to a lack of resources, the armoured infantry company had been operating as a two-platoon company as shown previously in figure 1.4.33. A decision was taken by the company commander, and agreed by the RATD staff, that the company would operate in a three-platoon company ORBAT on the 21 June 22. This allowed for a reserve platoon to be formed to enable the company to practice the use of a reserve to Witness 4 Witness 6 Witness 9 Witness 11

[165] This recommendation is in line with 20220701-ISSUE_SNvE_1453_Warrior_Rear Door-O.
[166] ORBATs describe the identification, strength, command structure, and disposition of the personnel, units, and equipment of a military force.

assault further enemy positions. As there were insufficient vehicles to form three complete platoons, the reserve platoon consisted of two vehicles and the other two platoons were reduced to three vehicles with which to conduct their attacks. The reserve, if used, would be bolstered by a vehicle from another platoon.

1.4.581. There were insufficient FV510s to form two complete platoons, let alone three. This had already led to FV511s being employed out of role as platoon vehicles, which has already been judged to have been a contributory factor in the accident. The decision to operate as a three-platoon armoured infantry company required individual vehicles to move between platoons during a tactical action adding further complexity. One of the exercise staff had concerns with this and found it was confusing even for an experienced commander. Witness 8

1.4.582. The added complexity when combined with the effects of being assessed, being inexperienced, lacking competency, having limited situational awareness due to operating 'closed down', and concurrent actions required to command was very likely to have impacted on the student commanders' cognitive burden. This could have affected their decision-making. The effect on decision making was also highlighted in the HF Report (page 32). It gave an overview of the theory on cognitive overload, divided attention and decision-making, and stated, 'Individuals who are completing tasks under divided attention have also been shown to neglect important information, demonstrate faulty reasoning and complete tasks slower and to a lesser standard', and, 'Although performance can be impacted in 'dual tasking', when attentional resources are stretched too widely between tasks, research indicates that 'task switching' is the most detrimental to performance'. Exhibit 158

1.4.583. Whilst the decision to move to three platoons was understood (to achieve certain TOs), it appears no consideration was given to the effects that this may have had on the inexperienced student commanders and the risk it presented. In such circumstances it would have been reasonable to have expected a dynamic risk assessment to be conducted to ensure there were suitable control measures in place. This was reflected in JSP 375 which stated the risk assessment, 'should be reviewed at the earliest opportunity as accidents can easily result from last minute changes to activities (especially dynamic activities such as military training exercises) where the consequences of change have not been fully considered.' The panel found no evidence of a dynamic risk assessment being conducted to take into account the effects brought about by this change. Exhibit 52

1.4.584. The panel concluded that the increased complexity brought about by the change from operating as a two-platoon company to a three-platoon company, likely increased the student commanders' cognitive burden and may have influenced their decision-making. The panel finds that the likely increased student commanders' cognitive burden brought

about by the increased complexities during the exercise was a **contributory factor**.

1.4.585. **Recommendation. Director of Defence Safety should reinforce to all commanders that in accordance with JSP 375, they must continuously assess the activity for which they are responsible and where the activity changes, the risk assessment must be reviewed (dynamic risk assessment) and additional control measures added if necessary.**

Commanding 'closed down'

1.4.586. The armoured infantry company departed from the hide location at approximately 07:00 to conduct an 'advance to contact' with the CR2 in support. Two objectives were planned for the morning. For tactical reasons, the Warrior crews were 'closed down' for the advance to contact. Exhibit 2 Witness 3 Witness 4 Witness 6

1.4.587. The diagram in figure 1.4.38, taken from the ATDU's trial report, shows the limited fields of view through a Warrior commander's periscopes and shows the extent of what a Warrior commander can and cannot see when operating 'closed down'. It also shows the extent of the blind spot to the rear of the Warrior and the closest distances where a commander can detect a person in the standing, kneeling and prone positions (4.8m, 11m and 14.2m respectively). Exhibit 111

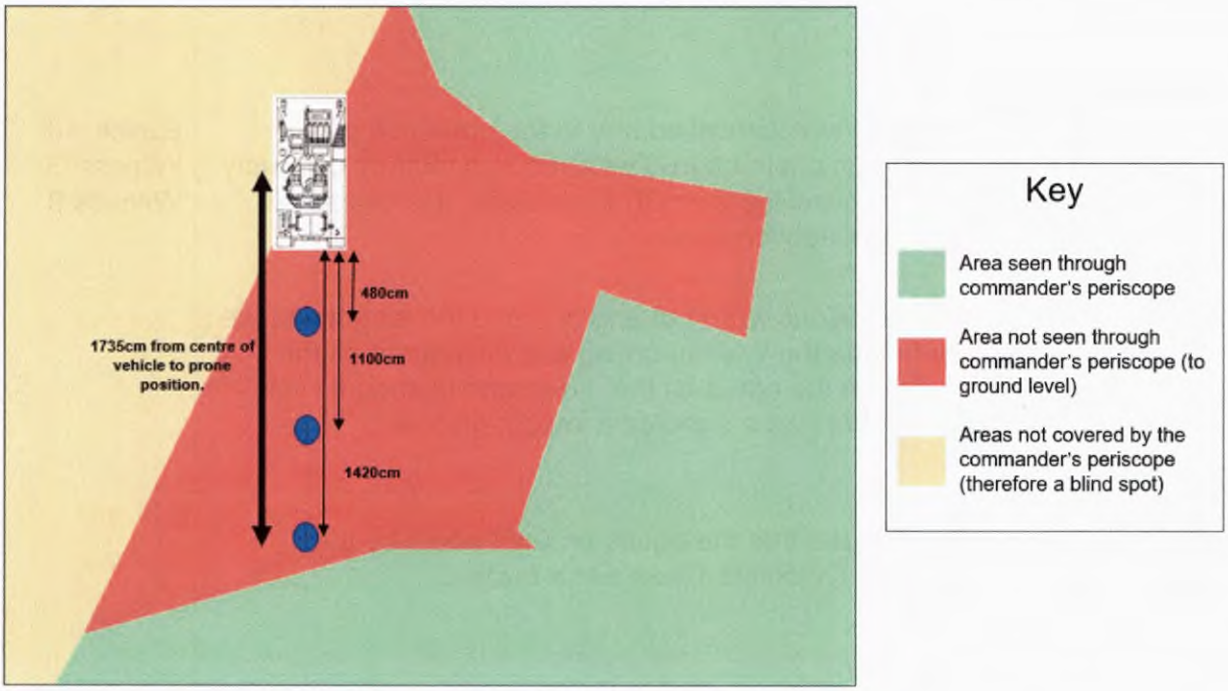


Figure 1.4.38 – Warrior commander's field of view and rear blind spot (closed down)

1.4.588. The trial confirmed that a Warrior commander's visibility, and thus their situational awareness, was significantly restricted when 'closed down'. For the AIPCC student commanders, the situation was exacerbated as they had not experienced commanding Warrior 'closed down' during the D&M module despite it being one of the conditions listed in the TPS for that module. Their experience of commanding 'closed down' was limited to the seven days preceding the accident. Whilst this gave them some exposure to the challenges of commanding 'closed down', they had not formally proven their competence in this configuration prior to undertaking the more complex tactical training. Exhibit 22 Exhibit 111 Witness 39

1.4.589. The panel concluded that a Warrior commander's limited visibility and situational awareness when operating 'closed down', combined with Student Commander 1's lack of experience of commanding Warrior 'closed down' was a **contributory factor**.

1.4.590. **Recommendation. Director Land Warfare should ensure that student armoured vehicles commanders do not participate in tactical exercises until they have demonstrated they are competent at commanding 'closed down' (where applicable) to ensure a safe progression of training.**

1.4.591. **Recommendation. Deputy Chief of Staff Field Army should seek to eliminate the Warrior's blind spot to the rear of the vehicle in order to reduce the risk of reversing related accidents.**

Objective 1

1.4.592. The first objective was cancelled due to the presence of livestock pennings causing an obstruction. The armoured infantry company remained static in a hide to allow the OPFOR to relocate. It is estimated they were static for approximately one hour. Exhibit 10 Witness 3 Witness 9

1.4.593. The weather conditions were hot and dry, and the lengthy pause had potential to further fatigue the Warrior crews and dismounts. In the panel's opinion it is likely that the effect on the crews and dismounts was negligible and unlikely to have had a significant impact on their performance.

1.4.594. The panel concluded that the pause brought about by the cancellation of the attack on Objective 1 was **not a factor**.

Objective 2

1.4.595. The OPFOR positions in the north-eastern and southern woods at Haxton O were attacked first. A further OPFOR position in the western circular wood at Haxton O then became the target for Student Commander 1's platoon. Two sections from Student Commander 1's platoon debussed Witness 11 Witness 35

from their FV510s and started the dismounted attack on the OPFOR's positions in the wood.

Depth position – the approach

1.4.596. As C/S 42A approached the target, the AECO noticed that the commander and gunner hatches were not secured, which had the potential to cause injuries. The AECO told them over the Bowman radio to rectify the issue, which they did. Dismount 1 commented that both they and 2Lt George were not fully alert, were not wearing seatbelts when transiting in C/S 42A, and were not monitoring the IC system. The wearing of seatbelts and monitoring the IC system by dismounts were mandated in AVSOs. Exhibit 20 Witness 6 Witness 16

1.4.597. The adherence to mandated procedures by the dismounts in C/S 42A may have waned as the exercise progressed as a result of boredom, fatigue or complacency. This also reflected in the HF Report (paragraph 50) which concluded, 'the conditions in the back of [C/S] 42A are likely to have been uncomfortable for the dismounts and are likely to have encouraged them to disengage from activities'. Some of the SET troops had commented they were getting little benefit from Ex CS as it was for the students benefit, not theirs, and this may also have created some apathy amongst them. The panel also assessed that the lack of an experienced armoured infantry platoon sergeant in the vehicle very likely contributed to the non-adherence to mandated procedures. Exhibit 158

1.4.598. The report of the dismounts not wearing IC headsets would have made communication between the crew and the dismounts difficult. This would have reduced their situational awareness as they closed in on their objective and would likely have affected their response to any commands from the commander, especially if they were not fully alert as Dismount 1 had stated.

1.4.599. The panel concluded that it was likely that the dismounts in C/S 42A lacked some situational awareness due to not being fully alert and not monitoring the IC system, which may have delayed their response to commands from the Warrior commander or led to them not fully understanding the commander's intent. The panel finds that the dismounts' alertness and level of situational awareness in C/S 42A was **an other factor**.

1.4.600. **A recommendation has already been made at paragraph 1.4.91, that the Chief of Staff Field Army should ensure that force elements participating in Warrior commander qualifying course tactical exercises are qualified, current and competent for the role that they are being employed and with the equipment being used, to ensure there is a safe system of work and that risks are as low as reasonably practicable (ALARP) and tolerable.**

Debussing procedure

Decision to debus platoon sergeant

1.4.601. As the two sections swept through the wood, the company commander noticed that they were in danger of firing at each other and suggested to Student Commander 1 that they may want to place someone on the ground to coordinate the two dismounted sections. Student Commander 1 acknowledged the suggestion and decided to deploy 2Lt George, as the platoon sergeant, to co-ordinate the two sections.

Exhibit 9
Witness 11
Witness 35

1.4.602. Student Commander 1 could have ignored the advice from the company commander, or provided a command element, by either debussing themselves or deploying 2Lt George as the platoon sergeant. The telemetry evidence that traced the dismounted sections' routes confirms they were moving towards each other and were in danger of having a 'blue-on-blue' incident. In the panel's opinion the advice to deploy a command element to control the sections was appropriate. Given the close proximity of the OPFOR's position to C/S 42A (approximately 100m – see figure 1.4.39), the panel assessed it would not have been tactically sound for Student Commander 1 to debus themself as this would have entailed a change of vehicle commander whilst C/S 42A was vulnerable to enemy fire. Therefore, in the panel's opinion, the decision to deploy 2Lt George to co-ordinate the two sections was appropriate.

Exhibit 9

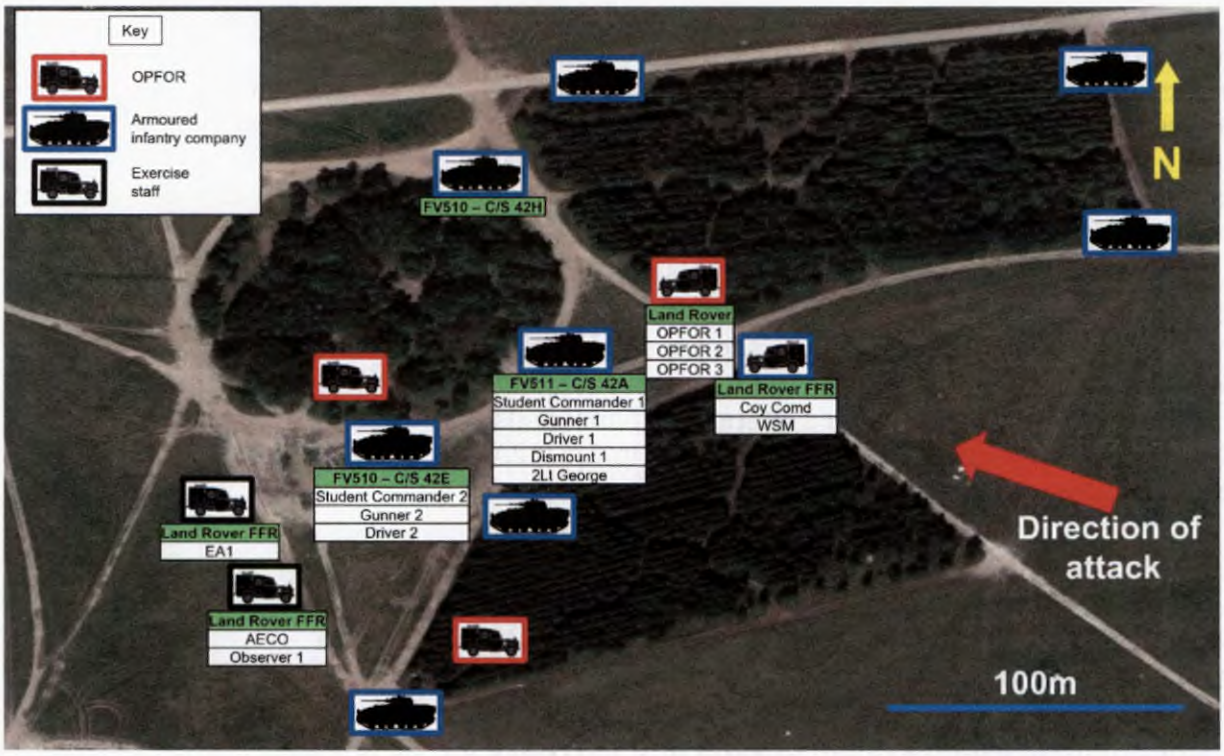


Figure 1.4.39 – Objective 2

1.4.603. The panel concluded that Student Commander 1's decision to deploy 2Lt George to co-ordinate the two dismounted sections was appropriate and was **not a factor**.

Warning order to debus

1.4.604. The All Arms Fieldcraft and AV Battle Drills pamphlet stated, 'during the immediate approach to the debussing point, the vehicle commander should give a detailed ground, enemy and friendly forces brief.'[167] Student Commander 1 recalled giving a warning order[168] to 2Lt George of their intent to deploy them to co-ordinate the two dismounted sections. Dismount 1, who was co-located with 2Lt George in the section working compartment, could not recall hearing the warning order.

Exhibit 54
Exhibit 101
Witness 16
Witness 35

1.4.605. The panel identified two key factors which are likely to have impacted on the effectiveness of the warning order to 2Lt George. Dismount 1 indicated that they and 2Lt George may not have been fully alert. In the panel's opinion Dismount 1 could not have been certain of 2Lt George's alertness when the warning order was given. Given the length of time that they had spent in the rear of C/S 42A, the hot conditions and the relative inactivity, it was likely that they may not have been fully alert, (highlighted in paragraphs 48 to 50 of the HF Report). Dismount 1 also stated that 2Lt George was not monitoring the IC system. Therefore, any communication between the crew and the dismounts in the section working compartment was likely to have involved shouting over the engine noise of the vehicle. Given the pace of the attack, any warning order was likely to have been brief and with limited detail. Had a warning order been received, its effectiveness was questionable as Dismount 1 also intended to debus, which was not Student Commander 1's intent.

Witness16
Exhibit 158

1.4.606. The panel **observed** that it was likely that a warning order to 2Lt George to debus was issued by Student Commander 1, but could not determine if it had sufficient detail or whether there was sufficient time for 2Lt George to adequately prepare themselves to debus.

Command to debus

1.4.607. Student Commander 1 gave the command to Driver 1 to halt when C/S 42A was positioned approximately midway between the two section FV510s. As it halted, Student Commander 1 gave the command to debus. Dismount 1 did not hear the initial command and asked the commander for clarification. The command to debus was then reiterated by Student Commander 1 and by Gunner 1.

Witness 16
Witness 22
Witness 35

[167] Mounted Close Combat (MCC) Training - Volume 1 Individual Training. All Arms Fieldcraft and AV Battle Drills. Page 7-3, paragraph 0704.a.
[168] Planning and Execution Handbook. Page 12-1 paragraph 197.c. Order: "a communication, written, oral or by signal, which conveys instructions from a higher to a subordinate". 'Warning' orders issued by commanders, contained maximum information and initial instructions to facilitate subordinates planning processes and preparation for a task.

1.4.608. Dismount 1 stated that there had not been an expectation to debus from C/S 42A during the day's tactical actions (during the exercise ordinarily only the sections debussed to conduct attacks, not a command element). Witness 16

1.4.609. As alluded to in paragraph 50 of the HF Report, the weather conditions, the length of time spent in the rear of C/S 42A and the lack of activity for the dismounts, very likely created an environment which made it difficult for the dismounts in C/S 42A to remain fully alert. The lack of situational awareness due to having limited visibility outside of the vehicle, and in this case the IC system not being monitored, were likely to have further degraded their alertness. A lack of alertness may have delayed a response to the command to debus and may have slowed the debussing procedure. However, there was no prescribed time that it should take to debus from a Warrior, and the cue to reverse is not based on time. Exhibit 158

1.4.610. The panel **observed** that the lack of anticipation to debus from C/S 42A by the dismounts, combined with a lack of alertness was likely to have reduced their response to the command to debus.

Rear doors opened

1.4.611. It took between 5 and 10 seconds for the dismounts in C/S 42A to open the rear doors after the vehicle stopped. Witness 13 Witness 28

1.4.612. The reported time for the rear doors to open was consistent with ATDU's time trial. This suggested that, even if there had there been any uncertainty or deficiency with the warning order, or command to debus, 2Lt George's reaction to the command was not delayed. Exhibit 92 Exhibit 111

1.4.613. The panel concluded that 2Lt George's response to the command to debus was timely and was **not a factor**.

2Lt George exits C/S 42A

1.4.614. As 2Lt George exited C/S 42A, they were seen to momentarily struggle either with their daysack or with the radio antenna that was connected to the radio in the daysack. They then reached inside of the vehicle for their rifle which, according to Dismount 1, had been next to 2Lt George's legs during the transit and not slung to their body. The Warrior Sergeant Major (WSM) also reported seeing 2Lt George close the rear left door and start to close the rear right door, and then open them again, as if they had forgotten some equipment. Others reported the doors swinging shut after being opened. Exhibit 86 Exhibit 98 Witness 11 Witness 13 Witness 16 Witness 28

1.4.615. The daysack (see figure 1.4.40) containing a PRC 354 radio with a folded 1.5m whip antenna (see figure 1.4.41) was found intact near 2Lt George immediately after the accident. It was not clear if 2Lt George was wearing the daysack when they exited C/S 42A (and subsequently

removed it prior to the accident), or if they were trying to put it on after exiting the vehicle.

Figure 1.4.40 – Daysack used by 2Lt George

Figure 1.4.41 – PRC 354 radio and folded 1.5m whip antenna

1.4.616. Had 2Lt George been wearing the daysack, the folded antenna would have protruded approximately 0.14m above the top of their helmet (see figure 1.4.42). It was normal procedure to have antennas folded whilst in vehicles as it was impractical to have it fully extended due to their length (extended the antenna would have protruded approximately 0.9m above the helmet - see figure 1.4.43).

Exhibit 94
Exhibit 95

Figure 1.4.42 – Radio antenna folded

Figure 1.4.43 – Radio antenna extended

1.4.617. Due to the FV511's relatively small rear door opening (see figures 1.4.42 and 1.4.43), it was feasible that the protruding antenna could have snagged on C/S 42A's rear door opening as 2Lt George exited (the top of the rear door opening was 1.76m above ground level). One of the debussing soldiers during the ATDU debussing trial also experienced this when their radio antenna snapped as it caught on the Warrior's hull. The struggle reported by those who witnessed the accident could have been 2Lt George trying to free the antenna from the rear door opening or taking the daysack off to free the antenna.

1.4.618. If the daysack was not being worn, the struggle the witnesses reported may have been 2Lt George trying to put the daysack on after exiting C/S 42A. This would likely have been difficult due to the small size of the daysack and the need to put it on over the body armour that they were wearing. As the daysack was found intact near 2Lt George after the accident, the panel assessed that it was likely they had been attempting to put the daysack on, then stopped and decided to carry it instead. Either scenario would be likely to have slowed the debussing procedure.

1.4.619. After 2Lt George's struggle with their equipment, they reached for their rifle, which was still inside the vehicle. The rifle was found to be still in C/S 42A after the accident, suggesting the vehicle reversed before they had the chance to retrieve it. In the panel's opinion a slight delay may have occurred as 2Lt George attempted to retrieve their rifle, and the debussing process may have been quicker had their rifle been slung to their body.

1.4.620. In the publications that refer to debussing (the FV510's AESP (2350-T-201-201) and Mounted Close Combat – Volume 1 Individual Training pamphlet) there was no direction or guidance on the carriage of weapons or daysacks when debussing from a Warrior. Those interviewed had differing opinions, which indicated to the panel that it was a personal preference based on ergonomics and the tactical situation. Exhibit 54 Exhibit 58

1.4.621. The report of 2Lt George closing one or both doors and then reopening them, suggested that they may have inadvertently closed them before reaching for their rifle or daysack. However, there was also a known issue with the mechanism that held the rear doors open, which prevented them from locking into position once opened (see section 5). It is possible that they could have unintentionally swung shut and opened again. Had this occurred, it was likely it would have hampered 2Lt George's exit from C/S 42A.

1.4.622. The ATDU trial outlined the complexity of the FV511's rear doors. The report highlighted that it required two hands to close the door efficiently, due to the multiple door handles (there were nine handles in total). It further stated, 'Having a weapon and individual kit to dismount, greatly increases the complexity of the dismount procedure on the WR FV511.' Exhibit 111

1.4.623. As part of a time trial undertaken by ATDU, during ten attempts for one person to debus from an FV511, the first two attempts took 106 and 124 seconds respectively. This compared to 33 seconds for six soldiers to debus from an FV510 (which had a powered mechanical door operated by the driver). On both occasions the time delay in debussing from the FV511 was due to the debussing person having difficulty closing the manual doors. Exhibit 111

1.4.624. The added complexity of the FV511's rear doors was reflected in the ATDU's debussing time trial which indicated that it could take longer for one person to debus from an FV511 than six people from an FV510. Full results of the time trial showed that the average time to debus from an FV510 was 30.5 seconds, against an average from an FV511 of 45 seconds.

1.4.625. However, even with the delays that 2Lt George likely encountered, their time to debus had still not exceeded the trial's average time of 45 seconds to debus from an FV511 (based on the telemetry evidence from the TES equipment that showed C/S 42A was static for approximately 38 to 43 seconds). Exhibit 9 Exhibit 111

1.4.626. The panel **observed** that 2Lt George's struggle with their equipment and rear doors was likely to have slowed their exit from C/S 42A, but not excessively when compared to an independent time trial.

Decision to reverse

1.4.627. Student Commander 1 recalled hearing a 'metal clunk' which they thought was the sound of the rear doors being closed. When they looked through the turret's right and rear periscopes, they reported that they could no longer see the doors and assumed that they had been closed. As they could not see 2Lt George they assumed that they had moved clear. They made the assessment that there had been sufficient time for 2Lt George to debus, and then waited a few more seconds to give 2Lt George some time to move out the way. Student Commander 1 then gave the command to Driver 1 to reverse. Witness 35

1.4.628. Student Commander 1's decision to reverse appeared to be based on the following factors:

a. **Sound**. Student Commander 1 was convinced the 'clunk' they heard was the rear doors being closed. The panel determined there were two plausible explanations for this 'clunk':

(1) **Traversing turret**. As 2Lt George was debussing, Student Commander 1 commanded Gunner 1 to traverse the turret to the right in the direction of the enemy. Gunner 1 reported using the power traverse[169] to rotate the turret from left to right through an arc of approximately 90° to 120° (see figure 1.4.44). As part of the investigation, the panel experienced the movement of a Warrior's turret when traversed using the power traverse. They noticed that the movement could either be a smooth rotation or completed by a number of smaller movements which jerked between each movement. In both instances the panel experienced a jolt when the power traverse stopped. The panel assessed that an inexperienced commander could have confused this jolt with the 'clunk' of the rear doors closing. Witness 22 Witness 35

[169] The turret can be rotated using power traverse or manual traverse.

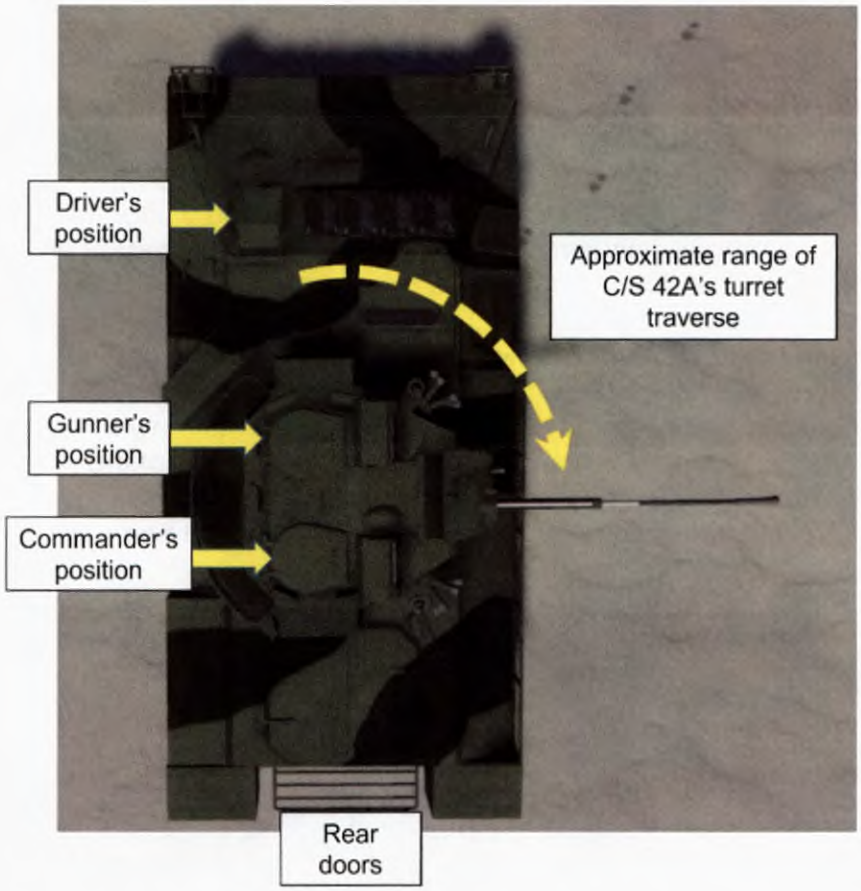


Figure 1.4.44 – C/S 42A's turret movement

(2) **Rear doors prematurely close**. The faulty mechanism that was meant to lock one of the rear doors in the open position would not have prevented it from inadvertently swinging shut as 2Lt George was debussing. It was also reported that 2Lt George appeared to inadvertently close then reopen the doors. As the rear doors were armoured and weighed 141kg and 143kg respectively, it is almost certain that, had they momentarily swung shut or inadvertently been closed and reopened, a distinctive clunk would have been heard. ATDU also identified during their trial that, 'The door slam with changes to the air pressure inside the vehicle is easily noticed by the crew. This has the potential to be misconstrued by an inexperienced commander or only familiar with operating the WR [Warrior] FV510.'

Exhibit 111
Witness 13

In the panel's opinion, it was almost certain that Student Commander 1 did hear a 'clunk', either caused by the turret's movement or by a rear door inadvertently closing as 2Lt George debussed. This likely led Student Commander 1 to believe that the rear doors had been closed and 2Lt George was moving clear. They would not have been able to confirm this remotely as C/S 42A's rear door open lamp on the DIP was not functional.

Exhibit 44

b. **Visibility**

(1) The view through an FV511's periscopes whilst closed down was limited. The limitation is shown in figure 1.4.38 which was taken from ATDU's blind spot analysis report. Additionally, a photograph taken of C/S 42A shortly after the accident showed equipment in the external stowage basket on the turret (see figure 1.4.45), and it was very likely the view through the commander's rear periscope was obscured by this equipment. Also, Gunner 1 had thrown a smoke grenade to screen 2Lt George from the OPFOR's view as they debussed and this may have further obscured the crew's visibility. Student Commander 1 checked to the rear of the Warrior and stated that they could not see the doors open or see 2Lt George. Thus they assumed the doors had been closed and 2Lt George had moved clear.

Exhibit 107
Exhibit 111
Witness 22
Witness 35

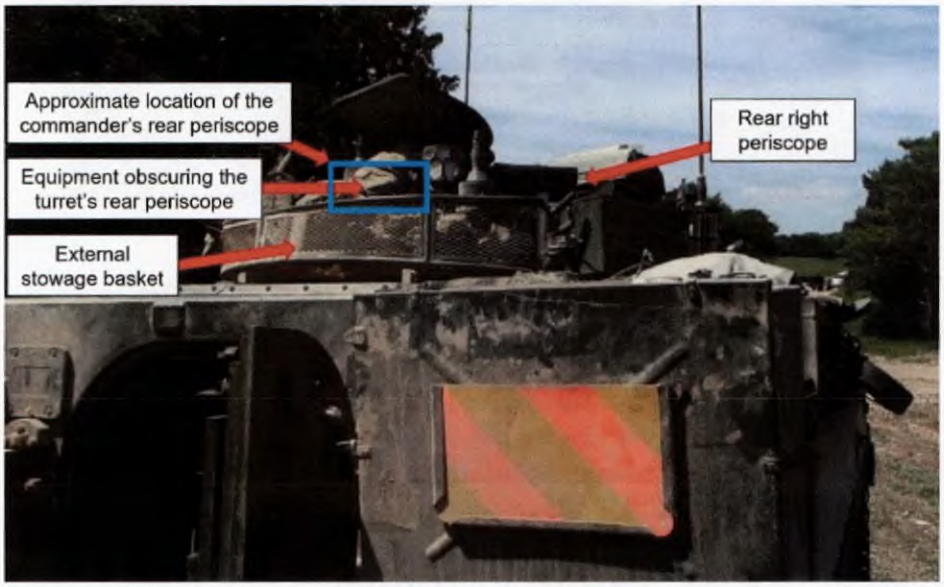


Figure 1.4.45 – C/S 42A's external stowage basket (taken post incident)

(2) The panel studied the visibility through an FV511's periscopes to determine what Student Commander 1 would have likely been able to see and determined the following:

(a) **Rear doors**

i. When C/S 42A stopped and the rear doors were opened, Student Commander 1 reported that they could see the tips of the rear door which indicated that they were open (represented in figure 1.4.46). The panel noted that with the turret facing forward, when viewed through the rear periscope, the tips of the rear of the doors could only be seen through the external stowage basket.

Witness 35

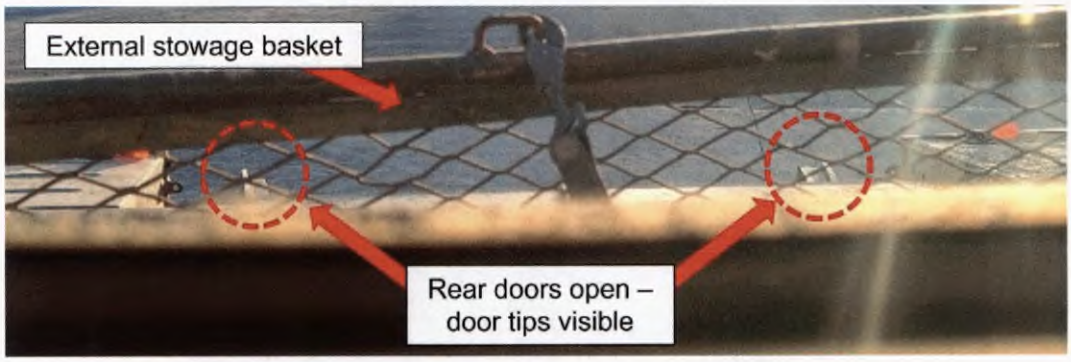


Figure 1.4.46 – An FV511 commander's view through a rear periscope with rear doors open (turret facing forward)

ii. At the time of the accident the external stowage baskets contained equipment. The panel determined it would have been unlikely that Student Commander 1 could have seen the rear doors open from a closed down position, with the turret facing forward, when the stowage basket contained equipment, as in figure 1.4.47.

Figure 1.4.47 – An FV511 commander's view through a rear periscope with rear doors open (turret facing forward and equipment in external stowage baskets)

iii. After the turret had traversed and after hearing the 'clunk', Student Commander 1 reported that they could no longer see the doors open and assessed that they had been closed. When the panel members looked through a forward right periscope with the turret facing to the right (represented in figure 1.4.48), the tip of the rear right hand door could barely be seen (see figure 1.4.49). However, to even see this, the panel members had to remove their helmets and place their faces right up to the periscope. Student Commander 1 would not have been able to do this, as the crew had to keep their helmets on. The panel assessed that it would have been extremely unlikely that Student Commander 1 would have

Witness 35

seen the tip of the doors, even if they were open. For this reason the panel formed the opinion that Student Commander 1 assessed the doors were closed, not because they were closed, but because they could not see them open.

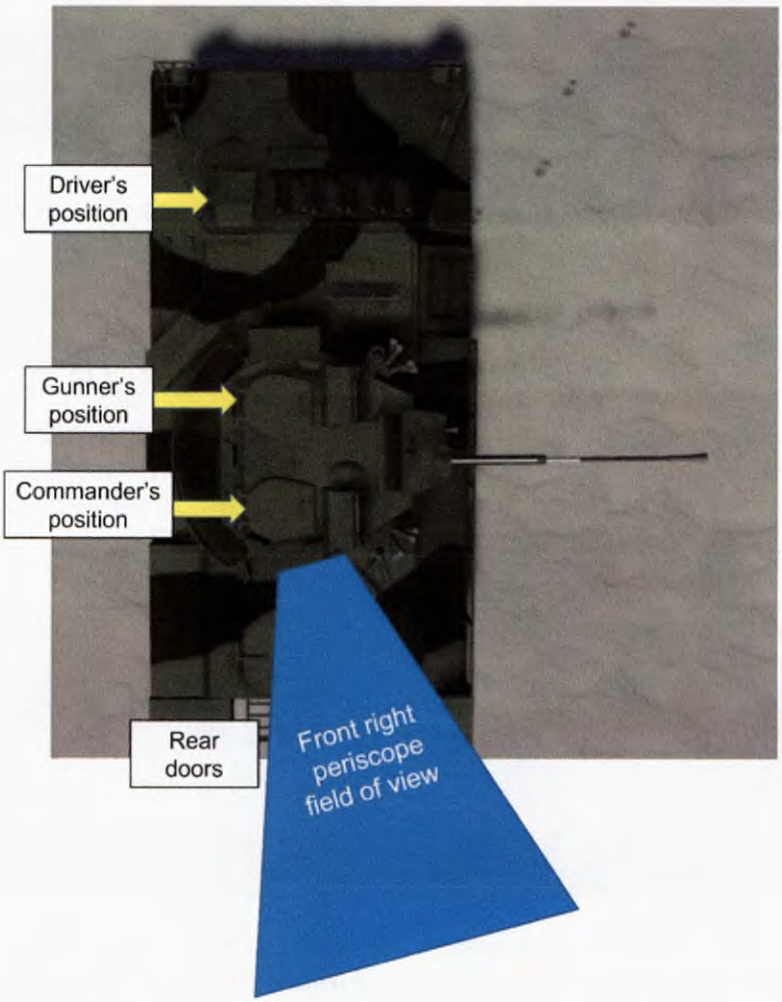


Figure 1.4.48 – An FV511 commander's field of view through the front right periscope (turret facing right)

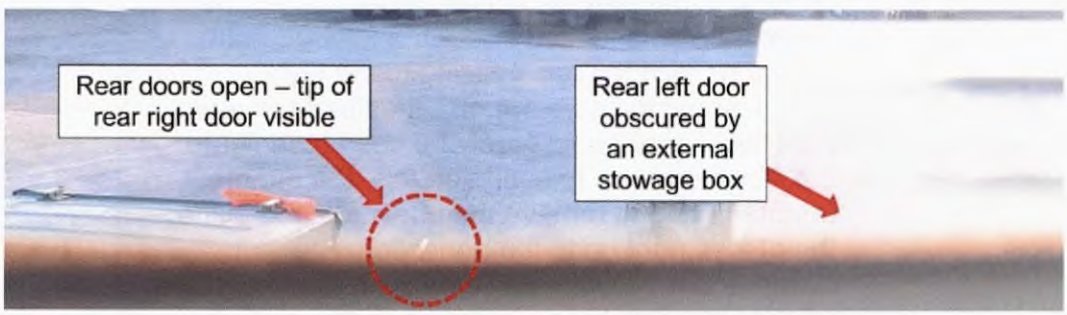


Figure 1.4.49 – An FV511 commander's view through a front right periscope with rear doors open (turret facing right)

iv. The panel explored one other plausible explanation for Student Commander 1 not being able to see the rear doors open. The movement of the turret may have momentarily disorientated them. Had they been looking out of the turret's rear periscope, they may have believed they were looking to the rear of C/S 42A, but actually would have been looking to the left-hand side of the vehicle (see figure 1.4.50). The panel discounted this as Student Commander 1 was clear that they looked to the right, which meant that they would have been looking out of the right-hand periscope as shown in figure 1.4.48.

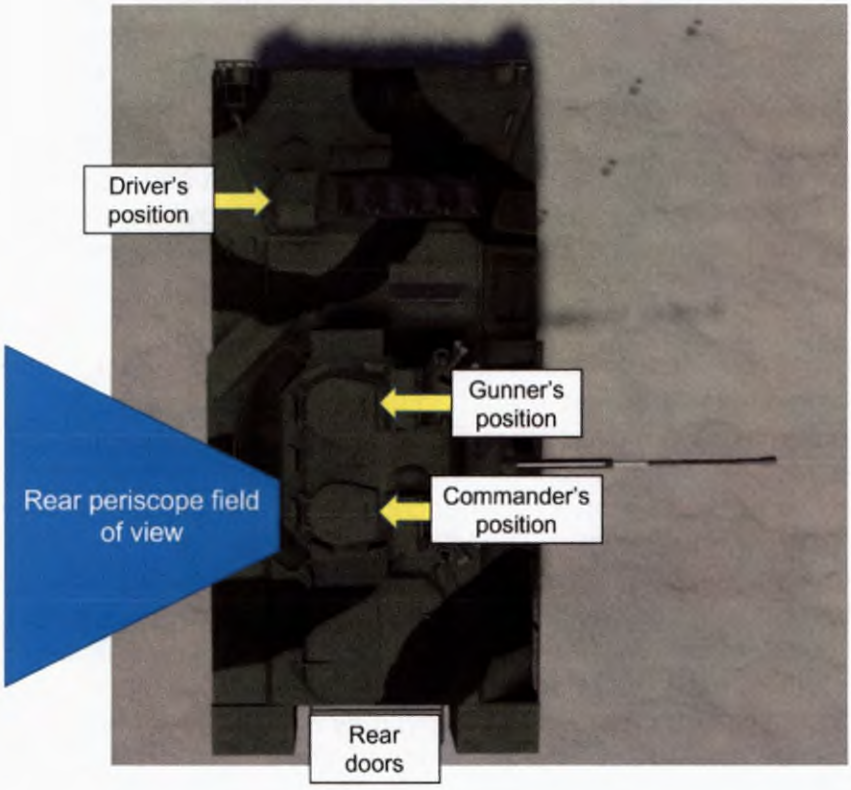


Figure 1.4.50 – An FV511 commander's field of view through rear periscope (turret facing right)

(b) **Dismount**. The ATDU blind spot analysis showed that a 'closed down' commander of an FV511 would not have been able to detect a standing person up to approximately 4.8m from the rear of the vehicle. For this reason, and because 2Lt George was reaching for their rifle inside the section working compartment at the time of the accident, it is almost certain that Student Commander 1 would not have seen 2Lt George at the rear of the vehicle, which led them to assume that 2Lt George had moved away. Exhibit 111

c. **Time**

(1) Student Commander 1 had debussed personnel from an FV510 on several occasions during Ex CS. During a time trial conducted by ATDU, the average time to debus a six-person section from an FV510 was 30.5 seconds (10 run throughs with the time ranging between 28 and 33 seconds). Exhibit 99 Exhibit 111 Witness 35

(2) Until the accident Student Commander 1 had never debussed personnel from an FV511 and, therefore, had no time comparison. The average time to debus one person from an FV511, during ATDU's trial, was 45 seconds (10 run throughs with the time ranging between 20 and 124 seconds). The debus procedures conducted during the trial were witnessed by the panel. The debussing procedure from the FV510 was slick and aided by a powered rear door that was closed remotely by the driver. By comparison the debussing procedure from the FV511 was awkward and made difficult by the requirement for the debussing soldier to open and close the rear doors. The soldier's proficiency did improve as the trial progressed once they had become accustomed to the door's mechanism. Exhibit 92 Exhibit 111 Witness 35

(3) In the panel's opinion, it was very likely that Student Commander 1 believed there had been sufficient time for 2Lt George to have moved clear. C/S 42A had been static for between 38 and 43 seconds, which was longer than the time they were likely to have experienced when debussing personnel from FV510s. The HF Report provided an explanation for this on page 21 which stated, 'Since the Student Commander had spent most of [their] time debussing troops from the FV510 over the course of the Ex, it is plausible that [they] had created a schema for this activity. As this schema was more practiced, [they] may have reverted to it when debussing 2Lt George from the FV511.' Exhibit 9 Exhibit 158

d. **Tempo**. Student Commander 1's rationale for the need to move so quickly after dropping off 2Lt George was based on the tactical scenario and the need to get out of the 'contact zone' (i.e. move away quick enough to not allow the OPFOR to locate and engage C/S 42A with an anti-armour weapon). This moving of position is also referred to as 'jockeying'.[170] Students' tactical abilities were being assessed throughout the exercise, of which jockeying was one aspect. Recordings of the radio traffic on that Exhibit 54 Exhibit 100 Exhibit 158 Witness 35

[170] Mounted Close Combat Training – Volume 1 Individual Training. Page 44, paragraph 0405. "**Jockeying**. If a vehicle remains in one location for too long giving covering fire to enable another AV to move, it is more likely to be acquired and destroyed by enemy fire. A commander may therefore choose to rapidly adjust their fire position after a few rounds. Jockeying is the term used to describe the manner in which an AV moves locally from one fire position to another on the same bound or battle position, in order to deal with a range of circumstances or tactical requirements. During jockeying, the AV should reverse out of sight keeping its frontal armour in the most likely direction of the enemy."

day revealed that commanders were constantly reminding individual crews to change position / jockey. It would have been reasonable for them to have expected to be judged negatively if they did not do so expeditiously. In the panel's opinion Student Commander 1 would have felt pressured to reverse as soon as possible after debussing 2Lt George, in order to maintain the tempo of the attack. This was also highlighted in the HF Report (page 31) which stated, 'A high optimism bias and a willingness to take risks, combined with a desire to impress whilst being under assessment may have prompted the Student Commander to act with haste'.

e. **Absence of an FV511 debussing procedure**

(1) Two publications detailed the debussing procedure from Warrior. Both referred to the FV510, neither referred to the FV511.

(a) **1002 D&M course folder – chapter 4.** The LSpec for the debussing procedure from the FV510 was contained in section 4. — Exhibit 24

(b) **AESP 2350-T-201-201 - FV510 Operating Information**. Chapter 3-10 detailed the debussing procedure from the FV510. — Exhibit 58

(2) The student commanders had been taught the debussing procedure from an FV510 during the D&M module, although this was not practised or assessed under realistic conditions. The procedure taught was contained in chapter 4 of the D&M module's course folder (LSpec), which was a direct extract from the FV510 operating information AESP. The operating instructions lists the following sequence once the last dismount had exited: — Exhibit 24 Exhibit 58

(a) **Dismounting section commander**: 'hits the door clear button[171] [which is not fitted on an FV511], moves away and gives a thumbs up to the Warrior commander.'

(b) **Driver**: '[calls] 'Door clear' (when the door clear light illuminates).'

(c) **Warrior commander**: 'On the driver declaring door clear or receiving the thumbs up from the section commander [gives the command] 'close door'.'

(d) **Driver**: '[calls] 'door closing' [and] operates the door close button. Informs the vehicle commander

[171] The term 'rear door' button is referred to as a button and a switch in the AESP.

['doors closed'] when the rear door lamp on the DIP is extinguished.'

(e) **Warrior commander**: On receiving the 'door closed' from the driver, the Warrior commander tells the driver to 'prepare to move.'

(f) **Driver**: 'Selects appropriate gear. Disengages parking brake lever. Holds the vehicle on the footbrake. Awaits [the] order [to move].'

The lesson ends at this point (i.e. it does not cover the command to move from the Warrior commander).

(3) The procedure did not explicitly state that the commander does not give the command to move until a thumbs up is received. The cue and start of the sequence stemmed either from the driver shouting 'door clear' or a thumbs up from the dismounting commander. In this case, Student Commander 1's cue was the belief that the rear doors had been closed. The prescribed procedure did not require the Warrior commander to check again once the door has been closed.

(4) It is noteworthy that one other student interviewed admitted that they had also given the command to move despite not receiving a 'thumbs up'. Their decision was based on visually sighting the dismounts to the side of the vehicle and assuming that all were out and clear. This highlights that in the heat of the moment, Warrior commanders may use several sources of evidence to make the decision to move. This was despite the reinforcement during safety briefs that Warriors were not to move until the 'thumbs up' had been received from the dismount commander, which, as highlighted, was not explicit in the publications detailing the debussing procedure. Witness 39

1.4.629. The panel concluded that although the vehicle commander felt obliged to reverse as soon as possible, due to the pressure of being assessed, they made the decision to reverse when they did, informed by their belief that the rear doors had been closed and that 2Lt George had moved clear. The panel finds that Student Commander 1's belief that the rear doors had been closed and that 2Lt George had moved clear was a **contributory factor**.

1.4.630. The panel concluded that the lack of a prescribed debussing procedure for an FV511, an inability to confirm doors clear due to lack of a door clear switch on an FV511, and a non-functioning rear door alarm and lamp, all contributed to Student Commander 1's decision to give the command to reverse before 2Lt George had moved clear. The panel finds

that the lack of endorsed procedures and functioning technical devices unknowingly denied Student Commander 1 a complete picture with which to make an informed decision, and this was a **contributory factor**.

1.4.631. **Recommendations have already been made at paragraphs 1.4.21 to 1.4.23 that front line commands should ensure that formal debussing procedures are incorporated into the operating instructions for those in-service passenger carrying armoured vehicles (AV) that they are responsible for, to ensure there is safe system of work in place for troops to debus safely from AV.**

1.4.632. **A recommendation has already been made at paragraph 1.4.322, that the Director Land Equipment should ensure that, for land equipment vehicles, all safety related modifications and associated systems are subject to hazard analysis as part of the overall safety case to determine appropriate maintenance schedules and operating procedures to ensure the resulting safety risks are as low as reasonably practicable (ALARP) and tolerable.**

1.4.633. **A recommendation has already been made at paragraph 1.4.305, that the Director Land Equipment should, where practicable, ensure that technical devices are fitted to all armoured vehicles that are capable of carrying passengers, to allow passengers to indicate they have exited the vehicle.**

Driver selects reverse gear

1.4.634. The driver put C/S 42A into reverse gear. As the rear doors were still open, the rear door alarm should have functioned at this point alerting the crew to the fact that the rear doors were open. On activation of the alarm, drivers were taught to 'select neutral and ensure that the rear door has been properly closed before reselecting the gear', in accordance with the FV511's operating information AESP.[172] As there was a fault with the rear door alarm it did not function.

Exhibit 59
Witness 16
Witness 32

1.4.635. The rear door alarm was an essential safety measure introduced following previous reversing related fatalities involving Warriors (see section 5). The fault with the alarm on C/S 42A was identified in 2018. It was not explicit in the Warriors maintenance and inspection instructions or SIM 11[173] that rear door alarms must work for the vehicle to be safely used. This was despite it being one of the measures introduced to reduce risks of reverse related accidents to ALARP.

1.4.636. In the panel's opinion, the lack of policy to ensure such alarms must function as intended to deem a vehicle safe to use was an oversight and invalidated the Warrior Platform Safety and Environmental Panel's

Exhibit 113

[172] AESP 2350-T-202-201, FV511 Operating Information. Chapter 3, page 17, paragraph 14.3.
[173] Standards and Inspection Manual 11 Tracked Vehicles.

declaration that 'risks are considered to be broadly acceptable or tolerable and ALARP'.[174]

1.4.637. In the panel's opinion, had the alarm functioned, it is almost certain that the commander would not have given the command to reverse and the driver would not have reversed (although not impossible, as the vehicle is still capable of moving despite the alarm sounding).

1.4.638. The panel concluded that it is almost certain C/S 42A would not have reversed had the rear door alarm functioned. A finding has previously been made at paragraph 1.4.363.

1.4.639. **A recommendation has already been made at paragraph 1.4.322, that the Director Land Equipment should ensure that, for land equipment vehicles, all safety related modifications and associated systems are subject to hazard analysis as part of the overall safety case to determine appropriate maintenance schedules and operating procedures to ensure the resulting safety risks are as low as reasonably practicable (ALARP) and tolerable.**

C/S 42A reverses

1.4.640. Driver 1 reported reversing at speed when the command to reverse was given by Student Commander 1. Dismount 1 who was still in the section working compartment, reported that 2Lt George was hit by the rear of the reversing FV511 which knocked them to the ground before it reversed over them. The WSM reported seeing 2Lt George knocked over and reversed over by the vehicle's left-hand track.

Witness 13
Witness 16
Witness 32

1.4.641. Reversing at speed was in line with 'jockeying' and was a recognised practice to avoid being engaged by enemy fire. In the panel's opinion, the speed at which C/S 42A was likely to be reversing, gave 2Lt George no chance to move out of the way and avoid being run over.

Exhibit 59

1.4.642. The panel concluded that the FV511 reversing before 2Lt George had moved clear was a **causal factor**.

1.4.643. **Recommendations have already been made at paragraphs 1.4.21 to 1.4.23 that front line commands should ensure that formal debussing procedures are incorporated into the operating instructions for those in-service passenger carrying armoured vehicles (AV) that they are responsible for, to ensure there is safe system of work in place for troops to debus safely from AV.**

[174] Minutes of In-service Warrior Platform Safety and Environmental Panel (SEP) 22.01 meeting held via teams on 24 February 2022. Reference Warrior SEP 22.01. Page 26.

'Stop, stop, stop' called

1.4.644. Those who witnessed the accident as it unfolded tried to alert the crew using various means, including shouting, waving, vehicle horns and 'stop, stop, stop' transmissions over the Bowman and Airwave radios. C/S 42A did not stop until the driver saw 2Lt George's body on the ground, by which time C/S 42A was approximately 40m from the impact site. Exhibit 9 Witness 11 Witness 13 Witness 16 Witness 19 Witness 23 Witness 28 Witness 32 Witness 40

1.4.645. In the panel's opinion the only way the crew could have received the message more quickly, was for a successful transmission over the Bowman radio. However, for technical reasons which are explained in section 5, this would have been extremely unlikely. Additionally, there would also have been a reaction time to be taken into account before the vehicle would have stopped.

1.4.646. The panel **observed** that had a message to stop got through quicker to the crew of C/S 42A, due to the speed of C/S 42A and reaction time required to stop the vehicle, the outcome would have almost certainly been the same.

Post-accident events

1.4.647. The medical cover for the exercise was provided by the armoured infantry company and the armoured squadron CMTs, both in their respective Bulldog ambulances. Each CMT supported their respective sub-units, although this was not detailed in the EASP. Exhibit 7

1.4.648. At the time of the accident both Bulldog ambulances were following their respective sub-units, but were experiencing technical issues. Due to these technical issues, the armoured infantry Bulldog ambulance and CMT were delayed getting to the casualty and the armoured squadron's ambulance and CMT were the first to arrive. The commander of the armoured squadron's Bulldog ambulance recalled that there was some confusion regarding the casualty's location. Despite this, they arrived at the scene approximately 10 minutes after the accident. Witness 12 Witness 17

1.4.649. The panel could find no evidence that the two CMTs were coordinated centrally to ensure medical response guidelines could be met in the event of an accident. The exercise staff were also unaware that there had been issues with both ambulances. Had the issues been known about, mitigation may have been put in place to ensure that at least one CMT was mobile and able to respond immediately if required.

1.4.650. Despite the technical issues and lack of coordinated medical plan, a Battlefield Advanced Trauma Life Support (BATLS) trained CMT did arrive at the scene within 10 minutes. This was within the operational medical planning guidelines of one hour which is shown in table 1.4.8 (taken from page 1-9, figure 1-5 of the Health Services Support to Land Operations Handbook). Exhibit 102

NATO medical treatment facility role definitions	IHS*	10.1.2(2)+2 medical planning guidelines	Medical group force element
First response. First response capability encompasses bleeding and airway control for the most severe casualties. Although not usually provided by an MTF. First response capability is described in this section to emphasise the continuity of care and its immense importance for the outcome of the medical treatment.		 Point of injury/illness	■ Self or buddy aid (MATT3 - BCD)
Role 1 MTF. A role 1 MTF is a national responsibility focusing on provision of primary healthcare, specialised first aid, triage, resuscitation and stabilisation.***	**Pre-hospital care**	**10 minutes** - enhanced first aid immediate life-saving measures, applied by personnel trained in enhanced first aid. Bleeding, airway control and administration of personal medical countermeasures for the most severely injured patients.	■ Team medic ■ Any medically trained personnel
		1 hour - enhanced field care emergency clinical care usually provided by a clinical team in a more permissive environment using battlefield trauma life support and other progressive techniques.	■ BATLS trained personnel ■ Pre-hospital treatment team ■ Medical reception station
Role 2 basic MTF (role 2B). A role 2B MTF provides a surgical capability, including damage control surgery and surgical procedures for emergency surgical cases, to deliver life, limb and function saving medical treatment. The surgical capability should be provided within medical timelines.	**DHC** forward**	**2 hours** - damage control surgery and acute medicine. Interventions designed to stabilise the operational patient pending further medical evacuation.	■ Forward surgical group ■ Air manoeuvre surgical group
Role 2 enhanced MTF (role 2E). A role 2E provides all the capabilities of the role 2B, but has enhanced capabilities as a result of additional facilities and greater resources, including the capability of stabilising and preparing casualties for strategic aeromedical evacuation.		**(2) hours** - damage control surgery planning timeline. Time for patient to receive damage control surgery and be stabilised ready for onward transfer.	■ Role 2E field hospital
Role 3 MTF. A role 3 MTF provides secondary healthcare at theatre level. This facility must provide all the capabilities of the role 2E MTF and be able to conduct specialised surgery, care and additional services as dictated by mission and theatre requirements, e.g. neurosurgery, maxillofacial surgery.	**DHC rear**	**+2 hours** - in-theatre surgery. Further in-theatre surgery and enhanced diagnostics.	■ Role 3 field hospital

* IHS - Integrated healthcare system
** DHC - Deployed hospital care
*** MTF - Medical treatment facility

Table 1.4.8 – Medical planning guidelines

1.4.651. The panel concluded that despite technical issues with both Bulldog ambulances, an appropriately trained medical person reached the casualty within the guidelines shown in the Health Services Support to Land Operations Handbook. The panel finds the delay was **not a factor**.

Management of the casualty

1.4.652. OPFOR 1 and EA1 arrived at the scene within seconds of the accident. Based on their observations [redacted] they assessed the casualty was dead and that nothing could be done to resuscitate them.

Witness 9
Witness 28

1.4.653. CMT 1 arrived at the scene approximately 10 minutes after the accident and assessed the casualty using a Tempus Pro monitor[175] to support an on-site diagnosis. No vital signs were detected.

Witness 15

1.4.654. Observer 1 relayed information to an ambulance service paramedic over a mobile telephone. The ambulance service paramedic confirmed that, based on the information received, CPR should be withheld as it was not in the casualty's interest and attempts to conduct CPR would be 'futile'. 2Lt George was certified dead by a doctor from an air ambulance that arrived at the scene approximately 32 minutes after the accident.

Exhibit 14
Exhibit 15
Exhibit 61
Exhibit 62
Witness 8

1.4.655. The conduct and leadership displayed by AECO and Observer 1 in the immediate aftermath of the incident ensured that the response to the incident was rapid, measured and dignified. They made a rapid assessment of the casualty and shielded others away in order not to expose them to the trauma. Their co-ordination of the emergency services was calm and precise.

1.4.656. The CMT's on-site diagnosis was done diligently and methodically, and the support from the ambulance service paramedic over the phone was invaluable in ensuring the correct and difficult decision had been made not to resuscitate the casualty.

1.4.657. In the panel's opinion, the management of the accident by AECO and Observer 1 was exceptional, and their professionalism undoubtedly would have been reassuring for those who had witnessed the accident.

1.4.658. The panel also commend the ambulance service for their rapid response, from the initial call-handler to the paramedic who calmly talked through the casualty assessment with the CMT and for the air ambulance's rapid arrival at the scene. Despite the tragic outcome, the response by all would have been very reassuring, to those who were there, that everything that could have been done for 2Lt George, was done.

1.4.659. The panel concluded that the medical management of the casualty was **not a factor**.

[175] The Tempus Pro was a lightweight, rugged portable device that monitors vital signs.

Summary of findings

1.4.660. **Causal factors**	
a. The panel finds that the Warrior's non-functioning rear door alarm was a **causal factor**.	1.4.363
b. The panel concluded that the FV511 reversing before 2Lt George had moved clear was a **causal factor**.	1.4.642
1.4.661. **Contributory factors**	
a. The panel finds the absence of an FV511 debussing procedure was a **contributory factor**.	1.4.19
b. The panel concluded that the lack of student commander distinction in AVSOs led to a deficit of policy regarding safety measures and supervision requirements for student AV commanders. This led to insufficient control measures being put in place during Ex CS for the levels of risk presented by inexperienced student commanders, and was a **contributory factor**.	1.4.34
c. The panel finds that the debussing training deficiency was a **contributory factor**.	1.4.113
d. The panel concluded that the job specifications for the DMIs in the AFVSR Combat Support Wing lacked a key qualification that led to not 'fully competent' AV commanders being employed as DMIs. This contributed to course content not being delivered to the correct level during the D&M module of the AIPCC, which the panel finds was a **contributory factor**.	1.4.181
e. At the time of the accident there was no effective supervision in place and the panel finds this was a **contributory factor**.	1.4.245
f. The panel finds the use of an FV511 as a platoon vehicle was a **contributory factor**.	1.4.303
g. The panel finds the use of the FV511 variant in this instance, contrary to that predicated in the Warrior CONUSE, was a **contributory factor**.	1.4.314
h. Due to the omissions from the AESPs regarding the sentencing of Warriors with non-functioning rear door alarms and FV511 debussing procedures, the safety risks with the Warrior platform were not ALARP or tolerable and this was a **contributory factor**.	1.4. 320

i. The panel concluded that the lack of explicit instructions to sentence a Warrior with a non-functioning rear door alarm as non-taskworthy or limited role nullified it as an effective control measure to reduce the risk of reverse related accidents. The panel finds this was a **contributory factor**.	1.4.330
j. The panel concluded that Student Commander 1 was not adequately trained or sufficiently practised and had not been assessed as a Warrior commander in the process of debussing personnel from an FV510 or FV511 prior to progressing to the AIPCC Tactics module. Therefore, they would not have been sufficiently competent as a Warrior commander to conduct the debussing procedure in a tactical scenario due to the training deficiency. The panel finds this training deficiency was a **contributory factor**.	1.4.418
k. The panel finds that the lack of formal training, practice and assessment of Warrior TTPs involving dismounts during the AIPCC was a **contributory factor**.	1.4.434
l. The panel finds that the lack of debussing procedure training was a **contributory factor**.	1.4.444
m. The panel finds that the use of the FV511 being used outside of its safe operating envelope was a **contributory factor**.	1.4.465
n. The panel concluded that the aggregated risk presented by inexperienced student commanders, the risk of dismounts being hit or run over during debussing, the lack of prescribed debussing procedures from FV511, and using FV511s in lieu of FV510s, had not been identified and the aggregated risk was not ALARP. The panel finds this was a **contributory factor**.	1.4.476
o. The panel concluded that there was no effective method of intervention available that could have stopped the Warrior reversing in time to have prevented the accident, and this was **a contributory factor**.	1.4.490
p. The panel finds that the competence level of the student commanders and the associated lack of supervision was a **contributory factor**.	1.4.541
q. The panel finds that despite receiving a debussing demonstration, the lack of systematic training, practice and assessment of the procedure was a **contributory factor**.	1.4.551

r. The panel finds that the omission of a check of the functioning of the rear door alarm in the 'before use' check, and the subsequent restriction on usage of the vehicle was a **contributory factor**.	1.4.578
s. The panel finds that the likely increased student commanders' cognitive burden brought about by the increased complexities during the exercise was a **contributory factor**.	1.4.584
t. The panel concluded that a Warrior commander's limited visibility and situational awareness when operating 'closed down', combined with Student Commander 1's lack of experience of commanding Warrior 'closed down' was a **contributory factor**.	1.4.589
u. The panel finds that Student Commander 1's belief that the rear doors had been closed and that 2Lt George had moved clear was a **contributory factor**.	1.4.629
v. The panel finds that the lack of endorsed procedures and functioning technical devices unknowingly denied Student Commander 1 a complete picture with which to make an informed decision, and this was a **contributory factor**.	1.4.630

1.4.662. **Other factors**

a. The panel finds the accessibility, format and layout of AESPs, was **an other factor**.	1.4.20
b. The panel finds the absence of policy regarding the non-firing aspects of AFV training was **an other factor**.	1.4.28
c. The panel finds that the lack of clarity in AVSOs on the definition and training of those who either operate from, or travel in AVs was **an other factor**.	1.4.35
d. The panel finds that the lack of coherence in AV doctrine and operating procedures was **an other factor**.	1.4.42
e. The panel finds that the lack of information from the CONUSE in the publications and doctrine associated with the vehicle was **an other factor**.	1.4.48
f. The panel concluded that D Company had not achieved BCS (armoured infantry) to level CHARLIE and, therefore, lacked sufficient armoured infantry competence to safely support Ex CS. The panel found this was **an other factor**.	1.4.90

g. The panel finds that the lack of formal dismount training and award of a competency was **an other factor**.	1.4.97
h. The panel concluded that D Company lacked sufficient armoured infantry competence to safely support Ex CS. The panel found that this was **an other factor**.	1.4.101
i. The panel concluded that the RATD lacked sufficient instructors to safely plan, conduct and supervise Ex CS and that this was **an other factor**.	1.4.120
j. The panel finds that the increased risk of company commanders lacking armoured infantry experience and qualifications was **an other factor**.	1.4.190
k. The panel further concluded that an inspector's lack of platform type experience could introduce risk of errors and omissions during vehicle inspections, and therefore, is **an other factor**.	1.4.220
l. In the panel's opinion the general lack of FV511 competence amongst Warrior crews was **an other factor**.	1.4.258
m. The panel finds that the challenges to the 5 RIFLES EC regime to be **an other factor**.	1.4.343
n. The panel concluded that Bowman radio was not an effective method of safety intervention due to its inability to override other Bowman radio transmissions. The panel finds this was **an other factor**.	1.4.377
o. The panel concluded that AIPCC students did not have a clear understanding of the different Warrior variants and the risks presented by using them in a role for which they were not intended. The panel finds this was **an other factor**.	1.4.425
p. The panel finds that the lack of understanding of the exercise staff responsibilities to be **an other factor**.	1.4.459
q. The panel found the lack of effective control measures to be **an other factor**.	1.4.489
r. The panel found that the confusion surrounding the use of 'real time commanders' was **an other factor**.	1.4.500
s. The panel finds that the lack of a formal vehicle HOTO procedure was **an other factor**.	1.4.532

t. The panel finds that student competence gap at the start of Ex CS was not closed and persisted throughout the exercise, presenting an increased risk to life and this was **an other factor**. 1.4.546

u. The panel finds that the unclear command relationships and lines of responsibility during Ex CS were **an other factor**. 1.4.574

v. The panel finds that the dismounts' alertness and level of situational awareness in C/S 42A was **an other factor**. 1.4.599

1.4.663. **Observations**

a. The panel **observed** that the fragmented and difficult-to-access information contributed to significant knowledge gaps amongst Warrior crews and instructors. 1.4.16

b. The panel **observed** that Doctrine Note 19/02 - Warfighting Tactics Part 5A: Armoured and Armoured Infantry Sub-unit Tactics, lacked detail that would have reinforced the intended use of an FV511 as shown in the Warrior CONUSE. 1.4.53

c. The panel **observed** that the absence of the FV511 from the Turret Weapons and Equipment – 30 mm Gun Warrior pamphlet could have misled users and instructors to believe that the FV511 was synonymous with the FV510. Whilst there were similarities, the differences that existed between the two platforms were not highlighted and this increased the risk of the FV511 being operated outside of its safe operating envelope. 1.4.56

d. The panel **observed** that the Turret Weapons and Equipment – 30 mm Gun Warrior pamphlet was formatted and accessed in a way that most soldiers were accustomed to. In the panel's opinion this made it easier to find and understand the operating instructions than in the Warrior AESPs. The panel opined that the preferred format for presenting all Warrior operating instructions was as presented in the Turret Weapons and Equipment – 30 mm Gun Warrior pamphlet. 1.4.57

e. The panel **observed** that due to the nature and scale of exercises undertaken on SPTA, there was an increased risk of accidents involving AV and dismounted personnel which was not reflected in the SPTA Military Training Facility Generic Risk Assessments. 1.4.64

f. The panel **observed** that allowing those at the scene of an accident on SPTA to call the emergency services direct, offered the benefit of enabling the emergency services to remotely assess a 1.4.68

casualty's condition, potentially through live footage sent over a mobile phone if available.	
g. The panel **observed** that the video entitled 'It's Plain Sense' was dated but still relevant. However, some of the outdated information and footage could detract from the messages the video was attempting to portray to users of SPTA.	1.4.71
h. The panel **observed** that Dismount 1 had been allowed to command a Warrior during Ex CS despite not being qualified to do so, which highlighted a general lack of understanding of the policy regarding those Warrior commanders who had not been tactically trained by an appropriate ARMCEN delivered AFV tactics course.	1.4.264
i. The panel **observed** that 2Lt George was suitably qualified to fulfil the role of a platoon sergeant operating in the light (dismounted) role. However, the panel was unable to determine if they were trained, in accordance with AVSOs, to operate from Warrior as a dismount soldier.	1.4.269
j. The panel **observed** that it was more likely than not that the retrofitting of the rear door alarm was an effective and essential safety measure that reduced reversing related accidents involving debussing troops from Warrior.	1.4.329
k. The panel **observed** that with a functioning rear door alarm and with fully trained personnel using prescribed debussing procedures, the risk of an accident occurring whilst debussing would have been very unlikely. Based on the CBA, the assessment not to fit cameras was considered correct at the time due to the grossly disproportionate costs, and a camera, whilst desirable, was not essential to ensure the risk was ALARP and tolerable.	1.4.335
l. The panel **observed** that the restrictions and measures required by the SNvEs at the time of the accident created additional challenges for the resourcing and management of equipment.	1.4.337
m. The panel **observed** that the delayed arrival of the CMT due to serviceability issues with the Bulldog ambulances did not impact on the outcome of this accident.	1.4.369
n. The panel **observed** that the Airwave networked Sepura radios were an effective means of communications to co-ordinate post-accident activity. However, they were an ineffective means of safety communications when used inside AVs.	1.4.384

o. The panel **observed** that the use of a non-issued daysack to carry the PRC 354 was not in line with service policy and it could not be deemed 'safe equipment'.	1.4.404
p. The panel **observed** that there was little reference to the specifications for the JNCO students in the AIPCC Tactics module (630T) course folders. Their role specification was subtly different to the platoon commander students, and this left a deficiency in crew commander specific TOs.	1.4.435
q. The panel **observed** that the Armoured Infantry Warrior Crew Commander Tactical Training Waiver (LWC_04_06_07_02 STT (MCC) dated 29 Apr 21) for personnel who had not conducted an ARMCEN delivered tactics course, presented risk if there was a deficiency in an individual's training progression that was not identified in the waiver application process.	1.4.445
r. The panel **observed** that the lack of a TrAD for the AIPCC Tactics module was a procedural deficiency, and the presence of clearly defined TOs and a valid SOTT for the module was sufficient for this to be classed as 'directed training' to meet the spirit of Pam 21.	1.4.456
s. The panel **observed** that the 5 x 5 RA impact grid used by RATD, as prescribed in ACSO 1200 offered greater clarity than the 3 x 3 RA impact grid depicted in the MOD Form 5010 (V1.3 07/2020) version, and its use should be seen as best practice.	1.4.475
t. The panel **observed** that the EASP could have been more explicit in detailing EA responsibilities and who was responsible for supervising each sub-unit with regards to supervision of blank firing.	1.4.483
u. The panel **observed** that it was unlikely that the outcome would have been different had there been a fully qualified and competent commander appointed as a 'real time commander' in C/S 42A at the time of the accident, due to the limited and differing fields of view to the student commander, a lack of defined responsibilities and lack of training as a supervisor.	1.4.501
v. The panel **observed** that several points in the AFV safety brief were either ambiguous or unachievable.	1.4.508
w. The panel **observed** that the medical plan was adequate. However, its effectiveness was reduced due to inconsistencies, lack of clarity, repetitiveness and lack of key information, notably a communications plan.	1.4.515

x. The panel **observed** that students and SET troops should not have been listed in the medical appointment of the EASP as this contradicted the direction given in Pam 21.	1.4.516
y. The panel **observed** that insufficient emphasis was placed on the SPO's role and responsibilities. This led to resourcing issues not being effectively addressed, and anomalies with staff responsibilities, the medical plan and the risk assessment in the exercise action safety plan not being identified and addressed.	1.4.523
z. The panel **observed** that the RATD staff's insertion of a demonstration of the debussing procedure at the start of Ex CS was appropriate and mitigated some of the risk presented by the student commanders' debussing training deficiency.	1.4.550
aa. The panel **observed** that the action taken by the exercise staff and the SET troops' chain of command following the near miss involving a dismounted soldier was dynamic, appropriate and mitigated some risk presented by the inexperience of the exercising troops.	1.4.556
bb. The panel **observed** that the lack of recording of 'before' and 'after use' checks in the vehicle documentation highlighted an apparent lack of adherence to the direction in the UECD, but assessed it was likely the checks were actually conducted.	1.4.564
cc. The panel **observed** that it was likely that a warning order to 2Lt George to debus was issued by Student Commander 1, but could not determine if it had sufficient detail or whether there was sufficient time for 2Lt George to adequately prepare themselves to debus.	1.4.606
dd. The panel **observed** that the lack of anticipation to debus from C/S 42A by the dismounts, combined with a lack of alertness was likely to have reduced their response to the command to debus.	1.4.610
ee. The panel **observed** that 2Lt George's struggle with their equipment and rear doors was likely to have slowed their exit from C/S 42A, but not excessively when compared to an independent time trial.	1.4.626
ff. The panel **observed** that had a message to stop got through quicker to the crew of C/S 42A, due to the speed of C/S 42A and reaction time required to stop the vehicle, the outcome would have almost certainly been the same.	1.4.646

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Part 1.5

Recommendations

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Part 1.5 – Recommendations

1.5.1.	**Fleet Commander**	
	a. Fleet Commander should ensure that a system is in place to ensure that activity owners apply the control measures listed in exercise risk assessments (for Navy exercises) in order to reduce the risk of incidents / accidents to as low as reasonably practicable (ALARP) and that they remain tolerable.	1.4.492.
1.5.2.	**Deputy Assistant Chief of Staff Littoral Strike**	
	a. Deputy Assistant Chief of Staff Littoral Strike should ensure that formal debussing procedures are incorporated into the operating instructions for those in-service passenger carrying armoured vehicles (AV) that the Navy are responsible for, to ensure there is safe system of work in place for troops to debus safely from AV.	1.4.22.
	b. Deputy Assistant Chief of Staff Littoral Strike should ensure armoured vehicles used by the Navy, are only used within their safe operating envelopes as defined by their safety cases. This is to comply with the safe system of work and to ensure safety risks are as low as reasonably practicable (ALARP) and tolerable.	1.4.307.
1.5.3.	**Deputy Chief of the General Staff**	
	a. Deputy Chief of the General Staff should reformat operating and maintenance instructions for armoured vehicles (AVs) and improve accessibility to the information. This is to ensure AV crews have the correct knowledge to enable them to safely operate and maintain the AVs for which they are responsible for.	1.4.24.
	b. Deputy Chief of the General Staff should ensure that those organisations responsible for delivering armoured vehicle tactical training, are sufficiently staffed with suitably qualified and experienced personnel to safely plan, conduct and supervise that training.	1.4.121.
	c. Deputy Chief of the General Staff should devise and implement an effective method of intervention to enable exercise staff to rapidly stop armoured vehicle movement in order to reduce the risk of accidents occurring during exercises.	1.4.378.
	d. Deputy Chief of the General Staff should ensure that a system is in place to ensure that activity owners apply the control measures listed in exercise risk assessments (for Army exercises) in order to reduce the risk of incidents / accidents to as low as reasonably practicable (ALARP) and that they remain tolerable.	1.4.491.

1.5.4. **Chief of Staff Field Army**

a. Chief of Staff Field Army should ensure that force elements participating in Warrior commander qualifying course tactical exercises are qualified, current and competent for the role that they are being employed and with the equipment being used, to ensure there is a safe system of work and that risks are as low as reasonably practicable (ALARP) and tolerable. 1.4.91.

b. Chief of Staff Field Army should ensure armoured vehicles used by the Field Army are only used within their safe operating envelopes as defined by their safety cases. This is to comply with the safe system of work and to ensure safety risks are as low as reasonably practicable (ALARP) and tolerable. 1.4.306.

c. Chief of Staff Field Army should ensure that units are appropriately resourced, and are enabled to prioritise to ensure vehicles are correctly maintained and inspected in accordance with the associated equipment support publication so they are safe to use in accordance with the safe system of work. 1.4.344.

d. Chief of Staff Field Army should ensure that Warrior commander qualifying courses are adequately resourced to ensure that safety is not compromised due to a lack of resources and that training objectives can be achieved within a safe system of work. 1.4.466.

1.5.5. **Deputy Chief of Staff Field Army**

a. Deputy Chief of Staff Field Army should ensure that formal debussing procedures are incorporated into the operating instructions for those in-service passenger carrying armoured vehicles (AV) that the Field Army are responsible for, to ensure there is safe system of work in place for troops to debus safely from AV. 1.4.21.

b. Deputy Chief of Staff Field Army should carry out a review of the employment of vehicle inspectors to provide assurance that they have appropriate experience on the vehicle type for which they are expected to inspect. 1.4.221.

c. Deputy Chief of Staff Field Army should seek to eliminate the Warrior's blind spot to the rear of the vehicle in order to reduce the risk of reversing related accidents. 1.4.591.

1.5.6. **Director Land Warfare**

a. Director Land Warfare should ensure policy and guidance is put in place for the safe planning, conduct and supervision of training 1.4.29.

involving the non-firing aspects of armoured fighting vehicle (AFV) training to ensure there is a safe system of work in place for AFV tactical training.	
b. Director Land Warfare should clarify Armoured Vehicle Standing Orders to ensure the status of student armoured vehicle commanders, their responsibilities, and the supervision requirements for them are clear.	1.4.36.
c. Director Land Warfare should ensure that formal training and an award of a competency is devised and implemented for all personnel who are required to operate from armoured vehicles as passengers to ensure they are competent and safe to do so.	1.4.37.
d. Director Land Warfare should review armoured vehicle (AV) doctrine and operating instructions for in-service Army platforms, and remove / correct any inconsistencies identified, to ensure that there is coherent direction and guidance on responsibilities and operating procedures for AV crews.	1.4.43.
e. Director Land Warfare should ensure that all doctrine relating to Warrior is amended to ensure the intended use of all Warrior variants, as outlined in the Warrior CONUSE, is clear. This is in order to improve the knowledge of those who employ and operate Warrior to ensure its use is in line with the safety case.	1.4.49.
f. Director Land Warfare should consider appointing a responsible 'lead school' to oversee all armoured vehicle courses where several training providers are responsible for delivering different aspects of the course. This is to ensure training is coherent and delivered in line with the training performance statement.	1.4.114.
g. Director Land Warfare should mandate that those employed as armoured vehicle (AV) driving and maintenance instructors, must themselves be fully competent AV commanders, where the subject matter requires training to be taught under realistic conditions, including in a tactical context, to ensure they are competent to deliver such training.	1.4.182.
h. Director Land Warfare should conduct a training gap analysis and implement measures to ensure that sub-unit commanders who re-role into armoured or mechanised infantry, are appropriately trained to be deemed competent for the role in which they are to be employed.	1.4.191.
i. Director Land Warfare should ensure that student armoured vehicle (AV) commanders are adequately supervised during tactical	1.4.246.

exercises to ensure the safe operation of AVs and the safety of the crew, passengers and exercising troops.	
j. Director Land Warfare should ensure that armoured vehicle (AV) crews are given the appropriate information, instruction, training and supervision during their AV qualifying courses to ensure they are competent to operate the specific variants of AVs which they can be expected to operate.	1.4.259.
k. Director Land Warfare should ensure that student armoured vehicle (AV) commanders are trained to debus personnel to Training Category 2, and summatively assessed to ensure they are competent in the procedure, before they conduct any tactical training as an AV commander (where the type and variant of AV that they command has a passenger carrying capability).	1.4.419.
l. Director Land Warfare should ensure that all those responsible for the delivery of Warrior training, understand the intended use and limitations of all variants of Warrior in order to ensure the correct information is used when instructing.	1.4.426.
m. Director Land Warfare should ensure that the lead training requirements authority for Warrior commander qualifying courses, amends the relevant role performance statements and training objectives to include Warrior tactics, techniques and procedures involving dismounts.	1.4.436.
n. Director Land Warfare should ensure that the lead training delivery authority amends the training design of Warrior commander qualifying courses to ensure Warrior commander students undertake Warrior tactics, techniques and procedures training involving dismounts, before progressing to platoon level tactics.	1.4.437.
o. Director Land Warfare should review the Armoured Infantry Warrior Crew Commander Tactical Training Waiver (LWC_04_06_07_02 STT (MCC) dated 29 Apr 21) and any updated version, to ensure that waivers are only issued to those who have been formally assessed in debussing personnel from Warrior.	1.4.447.
p. Director Land Warfare should review the requirement to establish a role of a 'senior exercise conducting officer' for large scale blank-firing exercises (above platoon level), in a similar way that senior range conducting officers are appointed for large scale live firing exercises, to ensure large and complex exercises are safely managed and staff responsibilities are clearly understood and defined. The role, if established, should be defined in the appropriate pamphlet.	1.4.460.

q. Director Land Warfare should ensure that those responsible for the planning and delivery of armoured infantry training, conduct a risk assessment where insufficient resources could impact on the delivery of a safe system of training, to ensure appropriate controls are put in place to reduce safety risks to as low as reasonably practicable (ALARP), or cease activity if this cannot be achieved to a tolerable level.	1.4.467.
r. Director Land Warfare should clarify the use of 'real time commanders' during the training of armoured vehicle (AV) commanders, and either formalise the role or dispense with its informal use, in order to ensure it is clear where AV commander and safety supervision responsibilities lie.	1.4.502.
s. Director Land Warfare should ensure that hand over / take over procedure of armoured vehicles as described in Armoured Vehicle Standing Orders is formalised and recorded by the vehicle commander. This is to ensure that all crew members are fully apprised of their vehicle's faults and limitations prior to its use and to the commander assuming command of the vehicle.	1.4.533.
t. Director Land Warfare should assure that student Warrior commanders demonstrate that they are sufficiently competent to command Warrior and conduct individual vehicle tactics, techniques and procedures involving dismounts prior to progressing to the platoon and company level tactical actions.	1.4.547.
u. Director Land Warfare should ensure that role and responsibilities are clearly articulated in exercise action safety plans to ensure all force elements participating in exercises fully understand their role and are not tasked to fulfil a role for which they are not qualified or authorised.	1.4.575.
v. Director Land Warfare should ensure that student armoured vehicles commanders do not participate in tactical exercises until they have demonstrated they are competent at commanding 'closed down' (where applicable) to ensure a safe progression of training.	1.4.590.
1.5.7. **Air and Space Commander**	
a. Air and Space Commander should ensure armoured vehicles used by the RAF, are only used within their safe operating envelopes as defined by their safety cases. This is to comply with the safe system of work and to ensure safety risks are as low as reasonably practicable (ALARP) and tolerable.	1.4.308.
b. Air and Space Commander should ensure that a system is in place to ensure that activity owners apply the control measures listed in exercise risk assessments (for RAF exercises) in order to reduce the	1.4.493.

risk of incidents / accidents to as low as reasonably practicable (ALARP) and that they remain tolerable.

1.5.8. **Deputy Commander Strategic Command**

a. Deputy Commander Strategic Command should ensure that formal debussing procedures are incorporated into the operating instructions for those in-service passenger carrying armoured vehicles (AV) that Strategic Command are responsible for, to ensure there is safe system of work in place for troops to debus safely from AV. 1.4.23.

b. Deputy Commander Strategic Command should ensure armoured vehicles used by Strategic Command, are only used within their safe operating envelopes as defined by their safety cases. This is to comply with the safe system of work and to ensure safety risks are as low as reasonably practicable (ALARP) and tolerable. 1.4.309.

c. Deputy Commander Strategic Command should ensure that a system is in place to ensure that activity owners apply the control measures listed in exercise risk assessments (for Strategic Command exercises) in order to reduce the risk of incidents / accidents to as low as reasonably practicable (ALARP) and that they remain tolerable. 1.4.494.

1.5.9. **Head Policy, Assurance and Compliance, Joint Support**

a. Head Policy, Assurance and Compliance, Joint Support should clarify the purpose of the commander's signature on armoured vehicle authority to use documents in order to clarify responsibilities. 1.4.534.

1.5.10. **Director of Defence Safety**

a. Director of Defence Safety should standardise the risk assessment (RA) process and proformas across defence with a common impact grid, and likelihood and impact criteria table, in order to simplify the RA process and provide a common risk scoring system to ensure risks are held at the appropriate level. 1.4.477.

b. Director of Defence Safety should improve risk assessment (RA) training to enhance hazard identification to ensure RAs have tangible outputs that reduce risks to ALARP. 1.4.478.

c. Director of Defence Safety should reinforce to all commanders that in accordance with JSP 375, they must continuously assess the activity for which they are responsible and where the activity changes, the risk assessment must be reviewed (dynamic risk assessment) and additional control measures added if necessary. 1.4.585.

1.5.11. **Director Land Equipment**

a. Director Land Equipment should, where practicable, ensure that technical devices are fitted to all armoured vehicles that are capable of carrying passengers, to allow passengers to indicate they have exited the vehicle.	1.4.305.
b. Director Land Equipment should ensure that, for land equipment vehicles, all safety related modifications and associated systems are subject to hazard analysis as part of the overall safety case to determine appropriate maintenance schedules and operating procedures to ensure the resulting safety risks are as low as reasonably practicable (ALARP) and tolerable.	1.4.322.
c. Director Land Equipment should ensure that the Warrior rear door alarm is checked as part of the 'before use' check, and direct that passengers are not carried in the rear of the vehicle if there is a fault with the alarm to reduce the risk of reversing related incidents to as low as reasonably practicable (ALARP).	1.4.579.

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Part 1.6

Convening authority comments

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Part 1.6 – Convening authority comments

Introduction

1.6.1. This service inquiry (SI) was convened on the 5 July 2022 to investigate the circumstances surrounding the tragic death of Second Lieutenant (2Lt) Max George, 5th Battalion The Rifles, who was taking part in Exercise COMBAT SPIRIT. The accident occurred on the Salisbury Plain Training Area on 21 June 2022 whilst 2Lt George was exiting a Combat Vehicle, Infantry Command, Tracked Warrior (FV511).

1.6.2. The SI panel has submitted its report to me after 11 months of detailed evidence gathering, interviews and analysis. The investigation discovered that similar accidents resulting in fatalities involving Warrior armoured vehicles had previously occurred in 1998 and 1999. A rear door alarm was fitted to the Warrior fleet following these accidents to prevent a reoccurrence. Sadly in this case, the rear door alarm did not work on this vehicle, the fault with it had first been reported in 2018 and was never rectified. Had the rear door alarm worked, it is almost certain the accident would not have occurred.

1.6.3. The report identified that there were numerous factors that contributed to the accident. It was the accumulation of these factors that led to the accident, not each in isolation. These factors spanned several areas, including, doctrine, organisation, personnel, equipment, operating procedures and training. The panel has made 48 recommendations and I would urge all commands to consider their wider applicability; many of these can be applied more broadly than merely tying them to the prevention of a similar accident. Having reviewed the report, I agree with the panel's findings and recommendations and offer the following observations.

Information / doctrine

1.6.4. The publications, orders and doctrine that governed the training, operation and equipment support of armoured vehicles (AV), and armoured infantry doctrine were contained in multiple sources of information. Some publications were dated, and lacked consistency and coherency. Some information was repeated across a spectrum of publications, leading to difficulty in determining which was the authoritative and correct source of information. Some of those who needed the correct and authoritative information had difficulty in finding it, this included experienced instructors and vehicle crews, many of whom resorted to using their own judgement or a locally produced document rather than referring to the authoritative document. This complex, confusing, contradictory and difficult to find information led to key knowledge gaps and safe practices either not being fully understood or not adhered to. This also led to individuals being employed in roles for which they were not qualified. Several recommendations have been made to rectify the identified issues. The common themes were to simplify, reduce repetition, update and clarify in order to ensure information is coherent, readily available and crucially, used.

Organisation

1.6.5. The inquiry identified several talented and dedicated individuals who were relentless in the pursuit of excellence in challenging conditions. In the panel's opinion, those challenges stemmed from an organisation (the Army) which was overcommitted, under-resourced and unable to master their core business due to competing requirements. It was also the panel's opinion that this was not an unusual situation and brought with it significant risk. That risk manifested itself during Exercise COMBAT SPIRIT, where a 'can-do' attitude prevailed. This led to a sub-unit being tasked to support an exercise involving student armoured vehicle commanders, despite being under-resourced and lacking sufficient organisational competence to support the exercise safely. Whilst not a contributing factor, such shortfalls increase the risk of similar accidents in the future.

Personnel / people

1.6.6. Verified records for some personnel were not provided to the panel and this made it difficult to gauge the competence of those who participated in Ex COMBAT SPIRIT. However, what was apparent from the analysis of the personnel related to this accident, was that many lacked armoured infantry and Warrior experience. This lack of experience at times led to personnel conducting tasks for which they were not qualified, not through a disregard of policy, but due to a lack of awareness of it. Some of those involved in the accident were undergoing formal training and their lack of experience and competence was to be expected. Until their competence was proven, it would have been reasonable to expect them to be closely supervised, but there was no recognised practice or policy in place to ensure this happened.

Infrastructure / place

1.6.7. Salisbury Plain Training Area catered for large-scale armoured manoeuvre exercises involving dismounted troops. The panel judged it to be a 'safe place' for the type of training being undertaken, and that it did not contribute to the accident. Whilst the outcome in this case was a tragic one, the response of the exercise staff and emergency services, demonstrated that even when operating remotely on Salisbury Plain the casualty was rapidly assessed and received the appropriate attention without delay. This is a testament to the emergency procedures as outlined in the Salisbury Plain Training Area Range Standing Orders and the exercise staff's knowledge and adherence of those orders.

Equipment / logistics

1.6.8. The focus of the equipment section centred on the Warrior FV511 involved in the accident. An inspection carried out under the Defence Accident Investigation Branch's supervision after the accident highlighted 24 faults that would have classified the vehicle 'non-taskworthy'. However, none of these faults contributed to the accident. One fault that did contribute to the accident was a non-functioning rear door alarm that had been identified on this vehicle in 2018 and never rectified. Had it been rectified, the panel are of the opinion it is almost certain that the accident would not have occurred. The rear door

alarm was retrofitted to the Warrior fleet of vehicles following similar fatal accidents dating back to 1998. However, an effective maintenance regime had not been introduced to ensure that it functioned as intended. The situation was exacerbated by the misemployment of the FV511 as a platoon vehicle, and not as a command vehicle as per its intended use outlined in its concept of use, a key component of the vehicle's safety case. At the heart of this was a flawed safety case and ignorance of the parameters of the safe operating envelope.

Training / practice

1.6.9. A combination of using equipment in a way in which it was not intended (a Warrior FV511 command variant as a platoon vehicle), a lack of prescribed 'safe practice' for personnel to safely debus from the FV511, and a training deficiency in the student commander's training progression created an aggregated risk that was not identified, assessed or mitigated. The risk was further exacerbated by the lack of a recognised method for supervising student armoured vehicle commanders undergoing tactical training. These shortfalls, when combined with the use of an FV511 that had a non-functioning rear door alarm (that had been retrofitted to prevent such accidents), presented a heightened and credible risk to life which set the conditions for the accident to occur.

Urgent safety advice

1.6.10. Immediately following the accident the fault with the rear door alarm was identified as a key factor. A safety notice was promptly issued to ensure that the rear door alarm on all Warrior armoured vehicles function as intended before they are used, and where they did not, limitations are placed on that vehicle.

Conclusion

1.6.11. Having read the report, I am content that this tragic accident has been investigated, analysed, and reported thoroughly, accurately, and rigorously. Whilst accidents will continue to happen, we have a responsibility to reduce all risks, particularly in a training environment, to a level that is as low as reasonably practicable whilst maintaining the military purpose. This accident was preventable and there are areas that we must improve upon with immediate effect to prevent a reoccurrence. I urge you to use this report as an opportunity to review how your people and departments conduct their business.

1.6.12. On behalf of the Defence Safety Authority, I offer my sincere condolences to Second Lieutenant Max George's family, friends and loved ones.

SJ Shell CB OBE MA
Air Marshal
Director General Defence Safety Authority