

swapped to a flight the previous evening by the MACM. To note, both the HP/NHP believed the MACM had been placed on the flight by their Flt Supervisors due to their inexperience, although this was not the case.

32. **ZA671 / 7 Apr 12 Sortie Profile.** The sortie was planned on a mobile RWAMPA computer the previous day. The sortie content was decided upon by the front crew, following discussion with the Flt Comd. The front crew wanted to achieve a range of flying tasks during the sortie that included IF currency flying, DLs, low level flying and a *stack* landing (rear wheels-on only). They created a flying route that would encompass all the sortie requirements. The route included operating in areas not previously flown by the HP, including a low level route along the Colorado River. The DLs were planned for locations neither pilot had operated to before under the supervision of a CR pilot, TC or QHI. The content of the sortie was more complex than had been flown in sorties with the TC during Ex VM12. Both the front crew confidently believed that the sortie was well within their capability. Neither crewman had any input to the planning of the sortie. The ground planning was very thorough, and the maps, planning data and flight aids assembled for the sortie were all found to be accurate and appropriate. The NHP completed the planning on the morning of the sortie with sufficient planning time allocated and he experienced no undue pressure.

W1-3, 5, 8
E9

E8

W7

E5, 9, 10-12, 14,
15

33. **Passengers.** The decision to take passengers during the flight was made on the morning of the flight as the content of the flight was deemed suitable by the crew to provide flying experience to ground crews. The Panel could not ascertain who made the original decision to seek passengers, but testimony shows that the aircrewmen sought to find passengers for the flight, rather than an operational need requiring passengers. Flights were offered to the Operations Sergeant, who had arrived in El Centro the previous day and to any Army Air Corps personnel from Ex LV12, who were free. Two Airtroopers jumped at the opportunity, as both were considering becoming aircrewmen.

W1-3, 5

W10-12

The Panel concluded that whilst the ground planning for the sortie was very thorough and well briefed, the content of the sortie was too testing for the crew composition; the potential risk outweighed the gain, including a “stack” rear wheels only landing and unfamiliar DL sites. This was a contributory factor.

THE ACCIDENT SITE

34. **Ex VM 12 HLS Directory.** Landing sites PIMON, PB5, P1 and training area Holtville were selected for DL practice during the sortie. This selection was based on the proximity of PB PIMON, PB5 and PB1 to the selected low flying route up the Colorado River. The sites were listed in the locally created SHF HLS directory. This directory was originally compiled 12 months previously for Ex VM11 to mirror the format of the HLS directory used on Op HERRICK. It had been widely used by SHF Flts in 2011/12, including 18B Flt, but not by Army units participating in Ex Crimson Eagle or Ex Lynx Vortex. The landing sites were selected in 2011 to meet the requirements of Pre-Deployment training, rather than the Environmental Training conducted by 27C Flt. All aircrew spoken to during the inquiry have commented that the areas and HLS surrounding El Centro and Yuma are very similar to the geographical characteristics of Afghanistan. The sites were recce'd by a JHSS MAOT team in 2011 (15 May 11) and by an 18B Flt / MAOT team in 2012 (3 Mar 12) (See Figures 10 and 11). However, the recce's were limited to a Chinook landing at the site and a brief inspection on foot by the MAOT and not a full recce as described in NATO ATPs²⁴ and the associated UK Supplement²⁵. The HLS Directory does not include accurate measurements of elevation.

E5, 13

W 7, 13, 15, 18,
23

W 9, 18

E6, 13

W13, 18

²⁴ NATO ATP-49(E) Vol 2 (2008)

²⁵ JDP 3-24.1 2nd Edition

35. **Host Nation Permissions.** No evidence could be found that landing permissions were ever sought or granted for the landing sites listed in the HLS directory as required by MAA RAs, JHC FOB and JHF (US) FOB²⁶. No instructions were listed in the NAF El Centro Deployment Guide or Base Ops presentation. Every SH detachment appears to have been operating under the assumption that, with the exception of the Yuma Range Areas and Holtville, for which there are clear agreements and operating procedures in place, aircraft could land anywhere in the Californian and Arizona deserts. At the request of the Panel, the UK Liaison Officer²⁷ spoke with El Centro Base Ops and the Public Relations Officer (PRO) NAFEC regarding the area of PB5 post the accident. They stated that it is unlikely that permission to land at PB5 would ever have been granted, if sought, due to its location in a nature sanctuary. It was not clear during interviews why landing permissions had not been sought or who was responsible. There appears to be confusion within the Chinook force as to where this responsibility should lie; the Squadron aircrew, MAOT officers, SHF HQ Ops and Planning staff, JHC staff or JHC (US) staff.

W 7, 13, 15, 17,
18, 22, 23

E 7, 16, 63-75

E76

36. **Landing Site PB5.** PB5²⁸ and the actual crash site²⁹ - 368m to the East, are actually located within the Mittry Lake Wildlife Area, owned by the US Department of the Interior, not the US Military. This is clearly marked on the US Department of the Interior Bureau of Land Management Map (BLM 2007) for Arizona. Although widely available to the public, this map was not used by the detachments. The area is subject to the Lower Colorado River Multi-Species Conservation Programme being conducted between 2010-2016. The area characteristics are continually changing; sand is being dredged from the Colorado River³⁰, dried and widely redistributed across the whole area, including PB5 and the location that ZA 671 crashed. These facts were never uncovered during either May 2011 or March 2012 recces, despite considerable difference in the sites between the 2011 and 2012 (See Figure 10 and Figure 11). In the 1km² area surrounding PB5 and the actual crash site, the surface varies considerably between very soft sand, a surface with a hardened rutted crust with softer sand underneath, and a harder surface / sub-surface. The sand is described by locals as "moon dust". PB5 was described as "Slightly rutted field with crust on top. Dusty and soft." in the HLS Directory. This is considered to be a fair, albeit brief description of the area by the Panel. It is feasible that the surface may have altered again since the aircraft landed on during the recce on 3 Mar 12. PB5 had been used by 18B Flt during Ex VM12 without incident; however, the characteristics of PB5 are different from those found at areas such as Holtville, where the majority of the EQ training was conducted by 27C Flt.

E77

E78

W10
E6

W4,6
E8,13

37. **Accident Site from the Air.** The accident LS was clear of obstructions with a clearly defined position marker – a small tree, but it was impossible to gauge its size due to the lack of other visual clues. However, the approach was completed to a position slightly forward of the position marker and the surface was very indistinct due to the moving and laying of thousands of tonnes of sand in the area. The unfamiliar visual clues gathered from the surface conditions during the final stages of the descent may have contributed to visual disorientation, and a lack of realisation of the true rate of descent.

E23

38. **MAOT.** 27C Flt received no hand over regarding the HLS directory or suitability of the landing sites from 18B Flight or by the MAOT Officer, who was integral to 18B Flt's training and conducted the landing site recces on 3 Mar 12. The MAOT officer recollects that she did not brief any 27C Flt personnel on the content of the HLS Directory. Any offer to do so was declined by the Flight and she had understood from 27C Flt Comd that the

W8, 18

²⁶ MAA RA 2309, JHC FOB 2309.100.1 and JHF(US) FOB 101.105.1. See Appendix B.

²⁷ SO2 J4 Ex Support NAFEC

²⁸ PB5: 32° 51' 77N / 114° 27.99W

²⁹ Crash Site: 32° 51.47N / 114 27.46 W

³⁰ Unrecorded Interview with (S40) (civilian) on 13 Apr 12

HLS Directory would not be used as 27C would be conducting EQ training in the Holtville area and not Pre-Deployment training. The Flt Comd recollects that he did ask for the directory from the MAOT but did not state whether he would use it. Whilst accounts vary during interviews between 27C Flt Comd and the MAOT officer, the Panel concluded on balance that the MAOT officer was under utilised by 27C Flt. She departed the exercise without relief on 2 Apr 12, as originally planned.

39. **Lack of Prior Use of LS.** Two of the crew had landed at PB5 during a previous sortie on 31 Mar 12; Acmn 1 and ZA 671 NHP. However, both were in the rear of the aircraft. Acmn 1 had previously observed the heavy works vehicles at the location but had not questioned the relevancy of their activity to the integrity of the landing site, only the potential to obscure it. Neither ZA671 HP/NHP had visited the landing site whilst operating from the cockpit or jump seat. None of the training staff, including the Duty Authoriser or Flight Commander, had visited the site during this detachment but had the previous year.

W 1, 5
E8

W 6-8

40. **LS Analysis Conclusions.** In summary, there was no landing permission in place to land at PB5 at any time during Ex VM 11/12, none of the training staff had visited the site during this detachment, the characteristics of the area were constantly changing, and the area had far softer sand than found in the Holtville area previously flown by this inexperienced front crew. Coupled with the high rate of decent, the soft surface caused a greater deceleration of the aircraft than the crew would have expected or had previously experienced.

The Panel observed that landing permissions had not been sought or granted at any LS used during Ex VM 12, albeit this was not considered a factor.

The Panel concluded that the selection of landing site PB5, and lack of understanding or appreciation of surface conditions at PB5 and the accident LS was an aggravating factor.

ZA671 FLIGHT AUTHORIZATION

41. **ZA671 – 7 Apr 12 Flight Authorization Process**³¹. The Duty Authoriser was 27C Flt's QHI (2000hr+, DFC/AFC holder with considerable experience in Afghanistan). He completed the Flight Authorisers course on 20 Sep 06. He was correctly authorized iaw Form 1575c (Authority to Authorize Flights within the Chinook Wing, dated 1 Mar 12) and accepted his 27C Flt QHI Terms of Reference on 5 Jul 11. The authorization process was conducted correctly iaw Chinook SOP 18. The flight briefing was conducted in good time and was exceptionally thorough. The only aspect of the flight plan that was questioned was whether the skills of the crew were sufficient to safely perform a *stack* landing as the front crew were not trained in mountain flying. However, it was decided by the DA that as the location of the *stack* was not being conducted in terrain classified as mountainous, it could be authorized. The DA had previously discussed the training progress of the front seat crew with the TC, but the TC had not been consulted regarding the crew composition of the accident sortie. The DA considered the content of the sortie to be "very benign". Based on the assessments of ZA671 HP/NHP training flights, the thoroughness with which the crew had approached the planning of the sortie and the flying conditions on 7 Apr 12, the DA was content that the crew were capable of executing the flight safely. The DA did openly question the decision for the NHP to assume the role of the Ac Capt. The Panel agreed that the DA had appropriately carried out the following tasks:

W7
E55, 79-80

W 1-3,5
E26

W6

- a. Correctly assessed the weather and environmental conditions for the sortie.
- b. Ensured the crew correctly understood the aims of the task.

E14

W1-3, 5

³¹ Responsibilities of a DA are listed in MAA RA 2306, JHC FOB 2306.105 and Odiham FOB 2305.100 Annex E. Summary shown in Appendix B.

c.	Ensured that the sortie was thoroughly planned and briefed.	
d.	Ensured that there was sufficient time and assets available to safely execute the task.	
e.	The authorization paperwork was completed correctly.	E5
f.	Correctly assessed that the aircraft's performance was within limits and capable of performing the detailed tasks.	Annex A
42.	DA Assessment of Crew Qualifications. The Panel concluded that the DA correctly assessed the HP/NHP as holding the correct EQ qualifications to conduct the sortie and notes that LCR/LCR front crewing is not restricted within any extant JHC or Chinook Force regulation.	E1-4
43.	DA Failure to Identify Currency Shortfalls. The DA failed to identify the currency shortfalls because:	
a.	Neither the HP or NHP featured markedly during training staff discussions as being a concern and calculation errors were made.	W 4,7
b.	There was a reluctance to refer to STARS during the deployment due to a false belief that the data was potentially inaccurate due to not being hosted on a live system, and therefore did not reflect the up-to-date hours flown prior to Ex VM 12 in the UK.	W 4, 7, 8
c.	The HP/NHP had assured the DA that they were current during the authorization process, which they both believed to be the case. They were not aware they were uncurrent until informed by the Panel.	W 2,5
44.	Factors Affecting the Authorization of the Flight. The Panel concluded that the DA should have given greater consideration to the following factors prior to authorization of the flight:	
a.	The DA had never flown with the HP/NHP, either airborne or in the simulator. He relied solely on the assessment of their capability to complete dust landings by the TC.	E 1,2, 8, 53,54, 58, 59
b.	The HP/NHP were both junior LCR pilots, with limited desert experience. Apart from the sorties listed in Para 24 during Ex VM12, they had only previously conducted dust landing training during the OCF in Jordan in Oct 11, 6 months previously.	Para 24
c.	The HP/NHP were both uncurrent (although this had no impact on their day flying abilities).	Para 17
d.	The sortie content was more complex than other sorties conducted by the HP/NHP during Ex VM 12.	E8
e.	The DA had not flown to the areas and landing sites selected for this sortie during this detachment. Although he had flown in the areas the previous year, they had changed significantly in the interim. He had not received any brief on the landing site from the MAOT officer.	W7, 18 E8
f.	The crew had flown significantly less flying hours over the previous 6 months since leaving the OCF than required to attain the competency levels listed within the	Para 20, 21

JHC FOB.

- g. The HP/NHP had only flown supervised dust landing serials at one location, Holtville, which was recognised as a site with limited dust and a hard surface.
- h. The last time the HP/NHP had conducted a *stack* landing was in Jordan in Oct 11, during their initial EQ.
- i. The NHPs skills as an Ac Capt had not been specifically assessed during Ex VM12 nor at any time since joining 27 Squadron, nor had he conducted any dust landings from the left hand seat. His total hours as an Ac Capt on the Chinook prior to the flight was 7:10 hours.
- j. The HP/NHP had only flown 4 and 5 sorties respectively each during Ex VM12, one of which was a familiarization flight.
- k. There was no formal operational or training need for passengers to be carried on the flight.
- l. DL are widely considered to be a higher level handling skill and have been contributory factors to a number of previous Chinook accidents and Cat 3 incidents.

W6
E8

E53,54, 60,61

W6
E2, 51, 58,

Para 24

Para 8

E81-86, 142

W6-9

45. **DA Perception of HP/NHP Professionalism.** The Panel noted that the professionalism and thoroughness of the crew during their ground planning and overall conduct both during the exercise and since joining the Squadron may have masked the level of the HP's handling skills and the NHPs LHS skills and command abilities in the air. This could have led to overconfidence by both the DA and the crew of their abilities. This factor could not be mitigated by the greater experience levels of the rear crew.

The Panel concluded that the authorized content of the sortie presented more risk than the potential gain warranted. The authorization process failed to identify or correct the risk. This was a contributory factor.

SQUADRON LEVEL SUPERVISION

27C Flight Commander Supervision

46. **Flt Comd Background.** 27C Flt Comd is a 2000+ hour pilot, whose previous Chinook flying experience was mainly on 7 Sqn (supporting Special Forces) and previously with the RAF SAR force. He accepted his Terms of Reference as 27C Flt Comd on 3 May 11. During Ex VM12 he oversaw every aspect of flying including approving the flying programme, training priorities and crew composition iaw his TORs. It is worth noting that 27 C Flt Training Officer, who was normally tasked with 27C Flt detailed training planning, was absent from Ex VM12,. The Flt Comd shows a good awareness of procedural safety critical process in mandating regular safety critical updates whilst located at Odiham. Crewing of LCR pilots together is a common occurrence within 27 C Flt. The Flt Comd firmly believes in this principle as a way of better developing the pilot's aircraft captaincy skills as he transitions from an LCR to a CR pilot.

W8
E55

E1,2, 8, 53, 54,
58,59

47. **27 C Flt Air Safety Meetings.** The Flt Comd ensured that an Air Safety meeting was conducted by 27C Flt during Ex VM12 (2 Apr 12). The meeting focused on FOD, other airspace users including Holtville traffic, US military traffic and crop dust aircraft, dust ingress to equipment such as CCPs and CDNUs, snakes and other dangerous wildlife and weapons hang ups. The Air Safety meeting minutes from 18B Flt and JSFAW were also discussed.

E87

48. **27C Flt Weekly Squadron Training Meetings.** Under the Flt Comd's direction, the progress of junior pilots is widely discussed by 27C Flt training staff and training records are kept. However greater priority for hours and attention is given to pilots looking to complete the CR conversion syllabus and to consolidate new CR crews rather than junior LCR pilots. The Panel concluded that the widely acknowledged professionalism of the HP/NHP on the ground is likely to have greatly contributed to both the Flt Comd and his training staff's overestimation of the HP's handling skills and the NHP's LHS skills and command abilities in the air.

W4, 7, 8, 24,
E 88

49. **ZA671 Crew Selection.** The front seat crew for this sortie was composed under the specific direction of the Flt Comd. He specified the tasks he wanted them to focus on, was directly involved with the planning of the sortie content and he aimed for them to primarily develop their captaincy skills, as well as build hours and consolidate the DL skill. However, he was not the Authoriser of the sortie and was not present at the Flight Briefing. The Panel concluded that the following factors should have had a greater impact on the decision by the Flt Comd as to whether the crew were fully capable of carryout the task.

W8

a. The Flt Comd had very little personal airborne knowledge of the HP/NHP's abilities. He has only flown one live sortie with the HP/NHP since they joined 27 Squadron in Nov 11, which was the short Ex VM12 area familiarization flight where neither handled the aircraft on 26 Mar 12; he conducted the NHPs squadron acceptance flight in the simulator in Jan 12.

E1,2, 53, 54,
58, 59

b. The HP/NHP had received little structured training since leaving the OCF.

Para 19
E 1, 2 53,54

c. The 27C Flt QHI (Duty Authoriser on 7 Apr 12) had never flown with the HP/NHP.

Para 19
E 1, 2 53,54

d. The 27C Flt 2IC, who planned the flying programme during ExVM12 and generated the sortie on 7 Apr 12, had never flown with the HP/NHP.

W4
E1,2, 53, 54

e. The HP/NHP were both junior LCR pilots, with limited desert experience. Apart from the sorties flown³² during Ex VM12, they had only previously conducted dust landing training during the OCF in Jordan in Oct 11, 6 months previously.

E1,2, 53,54, 58,
59

f. Although the Flt Comd stated he had read the HP/NHPs Ex VM12 training reports written by the TC, he has not added any comments or signed the reports.

W8
E51,52

g. None of 27C Flt's training staff nor the Flt Comd had flown to the areas and landing sites selected for this sortie during this detachment, although they had flown in the areas the previous year. He had not requested Flight landing site briefings by the MAOT officer.

W4,6-8
E8

h. The crew had flown significantly less flying hours³³ over the 6 months since leaving the OCF than required to attain the competency levels listed within the JHC FOB.

Para 20-21

i. The NHP was not correctly signed up as being qualified as an LCR pilot in his log book.

E2

j. The NHP's skills as an Ac Capt had not been specifically assessed during Ex VM12, nor at any other time since joining 27 Squadron; nor had he conducted any DL from the left hand seat during Ex VM12. His total hours as an Ac Capt on the

W6
E1, 51, 54

³² Listed in Para 24

³³ Shown on the Ex VM12 CI14 (Exhibit 88)

Chinook prior to the flight was 7:10 hours.

k. DLs are widely considered to be a higher level handling skill and have been contributory factors to a number of previous Chinook accidents and Cat 3 incidents.

E81-86, 142

l. There was no operational imperative for this sortie as this crew composition would never fly on OP HERRICK (which does not permit LCR/OCR front crewing)³⁴. The HP/NHP could have consolidated their DL skills with another TC/CR.

W6, 19

The Panel concluded that 27 C Flt's chain of command overestimated the competency level of the LCR / OCR front seat crew. This was a contributory factor.

Key 27C Flt Personnel – Training

50. **Flt Commander Training.** The Flt Comd had completed the Flight Authorisers Course on 9 Apr 03, the Flight Supervisors Course on 21 Jun 07 and CRM/HF training on 17 Jan 12. He had completed all the mandatory training courses. No specific training was available or given to the Flt Comd to assist in realigning or relating his obvious experience with that of inexperienced LCR pilots under his command prior to assuming his responsibilities. The Panel were concerned that a very experienced aircraft captain, but one with limited command experience, should be placed in the position of commanding a Flight at home and on detached exercise without any specific training or mentoring to assist him in relating his wealth of experience to the inexperience and paucity of flying achieved by his crews since they completed OCF. The Panel believes this is a risk for all aircrew brought up on JHF (A) operations where flying itself is arduous and often dangerous, but the support function is so well established that SH crews have only themselves to think about – there is very little exposure to command decisions at sub-Flt Comd level.

E89
W21, 26

51. **DA Training.** The DA completed the Flight Authorisers Course on 20 Sep 06 and CRM/HF training on 20 Nov 10. He was Competent to Instruct (C TO I) the Chinook on 31 Mar 09. He had completed all the mandatory training courses.

E79

52. **Flight Authoriser and Safety Meetings.** 27 Sqn last conducted a Flight Authoriser meeting on 28 Nov 11, however this was not attended by the DA or Flt Comd. 27 Sqn hold non-recorded Flight Safety meetings weekly, which will have periodically been attended by the DA and Flt Comd. These are used to discuss recent ASIMS report and other matters of flight safety interest within the Sqn. RAF Odiham conducted formal Flight Safety Meetings on 26 Sep 11 and 9 Dec 11; however, these were not attended by the DA or Flt Comd. A number of Flight Safety Stand Down days have been conducted at RAF Odiham over the past year.

E90, 91

E57, 92

The Panel concluded that the lack of available consolidation training for flight authorisers and specific Flt Comd training on assumption of appointment was contributory factor in the accident.

53. **27 C Flt Training Captain Training.** Airborne training was given to the HP/NHP by the 27C Flt TC, who was the only member of 27C Flt training staff to assess the HP/NHP in the air during Ex VM12.

E8, 51, 52

a. **TC Authority.** The use of TCs is permitted iaw JHC FOB³⁵ and ODI FOB³⁶. The TC was subject to a training syllabus that included zero speed landings³⁷. He

E93, 94

³⁴ JHC FOB J2105.000.3 (Exhibit 46) See Appendix B.

³⁵ JHC FOB J2125.101.1 See Appendix B.

³⁶ SH TASI Section: Aircrew Training Para 20b (Exhibit 62)

was authorised as a TC by OC 27 Squadron post a final assessment with OC Chinook Training Development Flight; an A2 instructor, in Feb 12. During Ex VM 12 the TC undertook one night sortie that included DLs with a QHI but not until 1 Apr 12.

b. **TC Qualifications.** The qualifications of the TC can be seen in Figure 12. Of note, the TC's STANEVAL check lapsed on 23 Nov 11 and he was un-current when he flew all sorties during Ex VM12, including all formally assessed DL sorties with the HP and NHP. The date of his last check was confirmed by STANEVAL as 23 Nov 09. Squadron staff stated that the incorrect date had been entered into STARS, thereby masking the error; however, the recorded date within the individual's aircrew log book is correct and was not detected by either the individual himself or during 27 C Flt Comd's monthly aircrew log book checks³⁸ until 4 Apr 12. A concession was requested on 5 Apr 12 by SHFHQ to JHC HQ but this was after all flying activities had been conducted by the TC during Ex VM12.

The Panel concluded that although the Training Captain was uncurrent for his biannual STANEVAL check during Ex VM12, this was not considered a factor in the accident. The TC was considered by the Panel to be SQEP to conduct the duties of a TC during Ex VM12, although a QHI check on arrival in El Centro might have been sensible, as he was recently qualified as a TC, prior to conducting training sorties himself.

E8

W 4,24
E 94 - 96

Officer Commanding 27 Squadron

54. **OC 27 Sqn Involvement in Ex VM12.** OC 27 Sqn joined 27 Squadron in Oct 11 and was therefore relatively new in post at the time of the accident. He had not yet had the opportunity to visit El Centro, but was scheduled to visit the following week. He was confident in the exercise planning as his staff had exercised in the area the previous year. He was confident that 27C Flt had deployed to Ex VM12 with a good supervisory chain, and that the Flt Comd had a good grasp of the purpose behind the exercise. He acknowledges that he was aware that the junior pilots had not completed much flying since graduating from the OCF; however, they were under the care of reasonably experienced personnel and confident supervisors. To note, he also believes that 27C Flt QHI (Duty Authoriser on 7 Apr 12) had flown with the HP/NHP on a number of occasions and that the DA would therefore have been personally confident in their ability to fly the aircraft prior to authorizing the sortie. However, this is not the case. The QHI had never flown with the HP/NHP.

W21

55. **LCR / LCR Crewing.** The OC was surprised at the LCR / LCR crewing of the accident sortie as he does not believe that the HP/NHP could have built up sufficient experience to reliably perform a zero speed landing (DL) within the required tolerances. Whilst he recognises the need to develop the captaincy skills of junior pilots by flying two LCR pilots together, his priority for Ex VM12 was environmental training.

W21

56. **Available Flying Hours.** OC 27 was fully aware of the lack of available flying hours to the Chinook force as he had discussed the issue with JHC personally and had submitted his own assessment of the Hours Tower. However, his own comments on the Ex VM12 CI14 regarding 27C Flt stated that C Flt will "arrive in El Centro with a good level of currency" despite only 3 of the 17 pilots, and 7 of the 14 crewman, achieving 45 flying hours in the previous 3 months - as required to be considered competent iaw JHC FOB. Five of the 17 pilots had achieved less than 30 hours. Stating in interview that "this requirement was now only aspirational for UK flying" due to insufficient airframes, this suggests a cultural acceptance of dilution of flying rate within 27 Squadron. Additionally, he had no knowledge prior to the investigation that P2 flying hours were being used to support

W21
E 88, 97

³⁷ SH TASI Section 2.0 Training Capt/Navigator and Crewman Trainer Syllabus. (Exhibit 62)

³⁸ Required iaw RAF Odiham FOB 2410

currency within 27C Flt.

57. **ExVM 12 Guidance.** OC 27 Squadron provided no guidance to Flt Comds on how to constitute crews during Ex VM12, and believes it is within the remit of the Det Comd. He did not discuss how the Det would be executed nor provide any specific direction or guidance. He relied on knowledge of how Ex Pashtun Vortex³⁹ had been conducted in Jordan on Oct 11, and the professionalism of his Flt Comds.

W8, 21

58. **27 Squadron Flight Safety Culture.** The Panel conducted a general overview of the Chinook accidents and incidents submitted to ASIMS since the OC joined the Squadron (1 Nov 11 – 30 Jun 12). The Panel concluded that on balance the flight safety culture within 27 Squadron is on par with that of 18 and 7 Squadrons and that a review of previous incidents could not have predicted this accident.

Annex F

The Panel concluded that despite the OC's recognition of the limited availability of flying hours within 27 Squadron, his concerns for junior crew development and own experience as a QHI, he provided no formal direction and guidance to deploying Flt Comds on Ex VM12. This was contributory factor.

EXERCISE VENTUS MAGNUS 12 ORGANISATION AND PLANNING

59. **Top Level Organisation of Ex VM12.** Ex VM12 was a JHC J3 planned and funded exercise. JHC Directive for Ex VM 12 was issued on 14 Feb 12. Official arrangement for the use of NAF EI Centro was coordinated through the British Defence Staff, located in the Washington.

W17
E 64-69

60. **Exercise Planning.** The exercise was planned by RAF Odiham SHF HQ Planning Staff, and the Exercise Instruction was issued on 10 Feb 12 by Stn Comd Odiham. Flying operations were ordered to be conducted iaw MAA MPR, JHC and RAF Odiham FOB. SHQ operations staff deployed to EI Centro led by SHQ Plans SO3. He did not form part of the 27C Flt Ex VM12 authorization chain.

W 22,24
E7

61. **JHF (US).** CO JHF (US) was appointed to NAF EI Centro between 18 Mar 12 and 30 Apr 12, which included the period when 27C Flt was deployed. He held Tactical Control (TACON), including disciplinary powers of all deploying units, including Ex VM12 and Ex Lynx Vortex 12a⁴⁰. The JHC Directive for CO JHF(US) clearly states that "Individual detachment, flight safety, training objectives and authorization will remain the responsibility of individual detachment commanders, under the supervision of CO JHF(US)" and he did not form a part of the 27C Flt Ex VM12 authorization chain. A JHF (US) Flying Order Book was in place for the duration of the exercise.

W15
E15, 69

62. **US-UK Liaison.** Liaison between UK Forces and the NAF EI Centro was facilitated by JHC SO2 J4 Ex Sp USA. His terms of reference were limited to liaising with the US authorities, exercise programming and providing J4 advice to JHC units exercising at EI Centro. He ensured planning authorization and necessary MOI's were in place. He was responsible for providing joining briefs to UK Forces and ensuring the appropriate flying briefs were provided by NAF EI Centro Base Ops. He did not form a part of the 27C Flt authorization chain.

W17
E98

E16

63. **JHC Command Instruction 14.** The recent experience and flying history of the deploying personnel was annotated in the Ex VM 12 JHC/CI14 prior to deploying which includes comments from OC 27 Sqn and 27C Flt Comd, and was forwarded to JHC J3.

E88

³⁹ Ex Pashtun Vortex is the EQ training exercise held in Jordan, similar to Ex VM.

⁴⁰ Ex Lynx Vortex 12a was 9 Regt AAC Lynx Mk9A EQ and PDT training which was run from EI Centro concurrently, but not linked to Ex VM12.

64. **Inter Flight Handover.** The only concern identified by the Panel relating to the planning and supervision of the overall detachment was that no hand over period was planned or conducted between 18B and 27C Flt. The Panel concluded that this would have assisted with discussions relating to the conditions at the landing sites.

W8, 18, 22,

The Panel concluded that Ex VM 12 was appropriately organised and supervised at Station, JHF (US) and Squadron level, and this was not factor.

65. **Training Resources.** 3 x aircraft were available for training evolutions during Ex VM 12. Although initially planned, the deployment of a 4th aircraft was cancelled due to lack of airframes available at RAF Odiham and transportation costs. The lack of a 4th aircraft resulted in some additional scheduled maintenance on the 3 aircraft causing a break in flying, and a lack of hand over opportunity between 18B Flt and 27C Flt. Additionally, due to 1710 NAS (MASU) tasks on Cat 3 undercarriage damage on 2 out of 3 aircraft for the majority of the detachment, including at the time of the accident, pairs DL training and FLIR training was limited. LCR flying was placed on the flying programme in lieu of pairs EQ training in order to try and consolidate the ZA671 HP/NHP training, advance their Captaincy experience and achieve the JHC suggested 45 hours in 3 months before deployment to HERRICK. Whilst the lack of a 4th aircraft impacted the exercise in that pairs training could not be completed, it is not considered a factor in the accident itself as a solo aircraft consolidation sortie could still have been authorized in order to use up spare hours after completing Desert EQ.

W23

W19, 20

W8, E99

The Panel concluded that the lack of the training resources i.e. a 4th aircraft, was not a factor in the accident as sole aircraft consolidation sorties, including with LCR crews only, could still have been authorized.

BROADER ORGANISATIONAL FACTORS

Duty Delivery Holder Oversight

66. **DDH Background.** The DDH was appointed on 27 Oct 11; authority in the form of a Letter of Authority to manage the Chinook force was properly delegated from Chief of the Air Staff.

W26
E100, 101

67. **DDH Management of Chinook Flying Hours.** Fully aware of the lack of available flying hours, the DDH fully endorsed the requirement for the weight of flying hours to be achieved by crews about to deploy on operations rather than all year round. Acknowledging the concerns of the Flt Comds who had highlighted that crews had not achieved 45 hours prior to deploying to HERRICK, his resolution has been to instigate better management of flying hours 3 months prior to deployment rather than trying to resolve the issue in the preceding weeks. His aim had been to better predict and accept the shortfalls in training and competency, increasing the potential to mitigate the risk with additional training, at home or in theatre if forewarned. His cultural message over the preceding 6 months had been “that a reduction in output is acceptable rather than pushing the organisation”.

W26
E102 - 104

68. **DDH Priorities.** His priorities for flying within the UK were PDT, the OCF and the LCR to CR progression, but he acknowledged the latter tended to be squeezed. Recent difficulties, in addition to HERRICK, were the addition of Op OLYMPICS and the Chinook Mk4 conversion programme. He introduced the recent change in deployment cycle for Op HERRICK, which reduced the frequency of PDT training in order to reduce the impact of the limited flying hours.

W26

69. **Acceptance of Risk Against Crew Competency.** The DDH had accepted the risk of Chinook crews deploying to HERRICK without achieving the JHC FOB required 45 hours

W26
E81, 82, 102-
104

in the preceding 3 months, without down-declaring capability. This is detailed in the pre-HERRICK CI14s. The DDH had not raised the lack of all year round currency and competency flying within the Chinook Force as an increased safety risk as it is not listed on the DDH Risk Register (see Para 81). He had put no additional mitigation in place to reduce this safety risk in terms of tighter regulation within his own orders, the RAF Odiham Flying Order Book, nor issued any formal advice and guidance to flight authorisers. He was not aware that P2 hours were being used to supplement flying currencies.

E47

70. **LCR / LCR Crewing.** The DDH recognised the need to conduct LCR/LCR pilot sorties to develop the junior pilot, but expected that it should be conducted in a fairly benign environment. He expected the Flt Comds to be intrusive into the type of sortie and how it is conducted. However, he provided no written directive to Squadron/Flight Commanders of his stance, how it was to be achieved or the limits to which an LCR pilot can be authorised to fly. He relied on the experience of the Flt Comds and mission command.

W26

71. **Mentoring of Flt Comds.** The DDH informally mentored each Flt Comd, particularly in the lead up to deploying to Op HERRICK, which included a review of the CI14, and regular discussions regarding crew composition. He was concerned with the lack of opportunities to develop Flt Comds such as detachments to Army exercises that used to be available prior to the HERRICK, believing this lack to be detrimental to their leadership development. In terms of management of Authorisers within the Chinook Force, he acknowledged that he has not put in place any formal meeting with Duty Authorisers. This is something he expected his Squadron Commanders to undertake.

W26
E102, 103

72. **Ex VM 12 Guidance.** He had visited El Centro in Feb 12, during a 7 Squadron exercise and was familiar with both the training area and the possible scope of the training. He spoke with both Flt Comds (18B Flt and 27C Flt) prior to their deployments, particularly in light of issues raised by STANEVAL regarding the execution of training by 7 Squadron. He was not part of the CI14 process for Ex VM12.

W26
E88

The Panel concluded that the lack of formal direction by the DDH to aircrew under his command concerning the lack of hours available, the associated increase in operating risk (particularly in UK and exercise flying) and the lack of mitigation to reduce the risk may have been a contributory factor .

Operating Authority – Joint Helicopter Command

73. **ODH Supervision.** ODH level supervision of all aircrew is carried out by personal visits to JHC Stations and also, more robustly in terms of air safety, through 2nd party air safety visits and audits by STANEVAL and Army Aviation Standards. STANEVAL last inspected 27 Sqn on behalf of the ODH on 30 Jan 11 – 11 Feb 11. To note, this was an inspection under the previous OC. No findings within the report could have highlighted a possible accident of this type, however, it did highlight that a number of personnel were out of date for STANEVAL checks which was the case with the 27C Flt TC at the time of the accident. There were no other ODH supervision issues.

E105

74. **Minimum Flying Currency.** In order to maintain competency, MAA RAs⁴¹ require that Duty Holders and Commanders promulgate the currency minimum for the safe operation of an aircraft by crew under their command. The full minimum currency requirements for all JHC aircrew are documented in JHC FOB (see Appendix B for summary). There is considerable evidence in STARS that the minimum currency requirements have become targets rather than absolute minimum for Chinook crews not deployed in HERRICK or conducting pre-deployment training. The low hours flown by ZA671 crew in the months post OCF training and prior to Ex VM12 support these findings.

E18, 102-104

E88
W27-32

⁴¹ MAA RA 2103. See Appendix B.

During interviews with JHC staff, no evidence could be found that explained or justifies why JHC considers the published minimum requirements for currency (or competency) to be sufficient to maintain safe operation of a Chinook aircraft. No formal evidence was found in support of the following currency related requirements:

a. **Currency.** "Currency"⁴² requires a minimum flying rate of 10:30 hours per quarter. This constitutes 3:00 hrs General Handling, 3:00 hrs Instrument Flying, 4:30 hrs Night Flying using Night Vision Devices and 3 reversionary approaches per quarter. By comparison the Navy Command minimum currency requirement⁴³ is 15 hours per month; more than 4 times greater, and their regulations emphasise that this is "the absolute minimum to be considered current".

E46

b. **General Handling.** Formal and agreed definitions of flying terms such as "General Handling" could not be found even though it is a currency requirement.

E46

The Panel concluded that the minimum currency requirements published within JHC FOB may not be sufficiently specific enough to assure operating risks are tolerable and ALARP. This may be a contributory factor.

75. **Flying Competency.** Although the JHC Flying Order books states "in order to maintain competency, Delivery Duty Holders should strive to ensure their aircrew achieve 15 hours per month / 45 hours per quarter", it is now widely acknowledged within both the Chinook Force and JHC that this is difficult to achieve in the UK all year round. There is an acceptance, both within Odiham Station and at HQ JHC, that aircrew will not be able to maintain this minimal flying rate except for the period 3 months before deployment on operations. The risk associated with this has been passed, under MAA construct, to the individual aircraft type DDH. The 45 hours per quarter flying rate is now only required by the DDH/JHC for crews deploying to Op HERRICK, albeit without any formal change to the FOB. Evidence found during the investigation concludes:

E88, 102-104

E8,21,26,27-32

a. Chinook crews conducting general flying in the UK are consistently failing to meet 45 hrs per quarter. Neither JHC nor the DDH expects to meet this requirement due to the lack of available flying hours, with periods of "feast and famine" becoming the accepted norm.

W26, 31, 32
E 8, 88, 102-104, 106

b. The flying rates achieved by crews deploying on PDT / EQ exercises, such as Ex VM 12, are failing to meet the 45 hrs per quarter requirement prior to deployment on the exercise. Neither the DDH nor JHC currently expect deploying aircrew to meet this requirement, although they expect crews to maximise these training opportunities to build hours prior to deployment on operational tours.

W26, 32
E88, 106

76. **CI 14.** Currently, a sizeable proportion of crews deploying on Op HERRICK are failing to achieve 45hrs over consecutive quarters prior to deploying. Figure 13 shows the last 2 Chinook flights deploying to HERRICK: 63% of front seat aircrew failed to meet this target. DDH/JHC aspires to meet this requirement but acknowledge this has not been possible this year. The risks associated with the lack of flying practise prior to deploying to HERRICK is documented in JHC Command Instruction 14 (CI14), and discussed between the DDH and the In -Theatre Commander. JHC are informed of the shortfalls but maintain that the DDH holds the associated risk. To date, the DDH has formally stated that he is content to deploy the crews.

W26, 32
E46, 100-104, 106

The Panel observed that the Chinook Force have not achieved the JHC

⁴² JHC FOB 2103.100.3. See Appendix B.

⁴³ Naval Aviation Orders BRd 767, 2010 Edition: Order N115.105 and N360.100.2. Aircrew are considered current to the end of the present calendar month if they achieve 15 hours in the previous or present calendar month. If this is not achieved, the rolling currency may be used.

published flying competency requirement This is considered to be an other factor.

77. **Dilution of Flying Rate with other JHC units.** The Puma ZA 934 accident (Nov 07) SI reported a lack of available flying hours within the Puma force and associated dilution of flying rate as factors. This prompted the following recommendation written by Comd JHC in Part 1.6 - the Convening Authorities' comments in Jan 11⁴⁴:

E107, 108

When home squadron based, Limited Combat Ready (LCR) Aircrew must achieve NATO minimum monthly flying hours (15) hours. These hours should include regular, supervised, continuation training with a QHI or Training Captain.

The Panel found that JHC have yet to take any actions to implement this recommendation across any JHC platform despite being a recommendation made by Comd JHC himself. The action is listed as "Recommended for Rejection" on the JHC PAAFU Action Grid. Had this recommendation been implemented across all JHC platforms it may have resulted in both the HP/NHP gaining greater quality flying time post OCF that would have better prepared them for flying activities during Ex VM 12.

E109

78. **Chinook Annual Flying Task.** The Panel reviewed the flying hours and the Annual Flying Task provisioned to the Chinook Force. The investigation concluded that insufficient flying hours are allocated to enable all active aircrew to consistently achieve 15 hours per month. This has been attributed to limited Top Level Funding, limited number of airframes, Op HERRICK, the Chinook Mk4 conversion programme, unscheduled maintenance (particularly Cat 3 repairs to undercarriage) and unfunded personnel utilising UK flying hours (such as STANEVAL). Flying rates achieved by a pilot during any given year are described as being on a "feast and famine"⁴⁵ cycle, with aircrew expected to reach the 45 hours per quarter competency measure just in time to deploy on Op HERRICK. The Panel established that the fragility of the Chinook Force to meet its operational commitments is an enduring high level issue being addressed at RAF Odiham and within JHC. However, the Panel is concerned that the lack of flying hours and failure to meet the published JHC competency requirements has become accepted across the Chinook force, and particularly within 27C Flt. Thus the safety risk associated with crews operating without regular flying hours, inconceivable 10 years ago, has failed to be recognised as a form of "risk shift"⁴⁶ and, whilst frustrated, experienced pilots have accepted the status quo and junior pilots, particularly those leaving the OCF during the last few years, have no expectation of a higher rate of flying. The associated increased levels of supervision required at flight level, particularly for inexperienced crews, may not have been applied robustly enough, due to the accepted cultural norm.

W21, 26, 29,
31, 32

E97, 110-114

W8,21
E 88, 102-104

The Panel observed that there is a cultural acceptance of lack of available flying hours across the JHC. This is considered to be an other factor.

79. **Logging of P2 Hours.** The Chinook fleet suffers a potentially significant degradation of quality flying time (that spent at the controls) because of the tacit agreement, through ill-defined instruction in the JHC FOB, allowing pilots flying in the jump-seat of the aircraft to log P2⁴⁷ time. The FOB does not state P2 cannot be used towards currency. The Panel ascertained that P2 flying hours have been widely used within 27C Flt to contribute towards minimum flying currencies and the 45 in 3 flying hours target prior to deployment on Ex VM

W2,6-9
E 8, 18

⁴⁴ ZA934 Service Inquiry Recommendation 14d. (Exhibit 110)

⁴⁵ Quote Witness 31

⁴⁶ Risk Shift as generally understood by military staff concerned with operational risk, as opposed to the group dynamics definition of Risky Shift mentioned in Para 10b.

⁴⁷ JHC FOB J 2401.105.6. (Exhibit 46) See Appendix B