



**PXR REPORT FOR EXPEDITION BSDMRE 2016**

**27 March – 31 May 2016**

## Introduction

1. The British Services Dhaulagiri Medical Research Expedition (BSDMRE) was a level 3 Tri-service AT expedition to Nepal during the pre-monsoon period in 2016. The expedition leader was Surg Cdr Adrian MELLOR, Consultant anaesthetist, DMG(N).
2. The exercise involved personnel from a wide variety of units and comprised a main climbing team (MT), high altitude development team (HADT) and 8 trekking teams. 123 personnel took part in the expedition, 24 on the main and HADT, 7 involved in the research and 92 trekkers. The detail of this PXR refers to the funding and objectives of the main and HADT. Where relevant to the overall conduct and execution of the expedition detail on management is given and feedback from individual trekking teams PXRs included.

## Aim

3. The expedition aims were;
  - a. For the MT to climb Dhaulagiri (8167m), without supplementary oxygen and in a lightweight style.
  - b. For the HADT and MT to acclimatise by climbing Dhampus Peak (6035m) and then to climb Tuckuche Peak (6900m) from a base camp in the Hidden Valley.
  - c. To complete the trek of the Dhaulagiri circuit with a number of independent trekking teams.
  - d. To conduct a complex and challenging programme of medical research.
4. Eight teams trekked the Dhaulagiri circuit, this was completed successfully by 84/92 personnel. The climbing teams were successful in climbing Dhampus peak (6035m) with 22 out of 24 personnel, achieving the first British ascent of Tukucho Junction and West peaks. The climbing effort on Dhaulagiri was thwarted at 7500m by unstable and windy weather. Considerable, unique research data was collected during the trek and at research stations at Italian BC (3600m), Dhaulagiri BC (4600m) and in the Hidden Valley (5140m).

## Preparatory Training

5. The team conducted formal training as follows;
  - a. **Selection weekend.** This took place at JSMTIC Indefatigable, September 2014. This was a structured weekend of lectures, social functions, individual interviews and AT activity (walking/scrambling).
  - b. **Winter training.** At Rothiemurchus Lodge, 26<sup>th</sup> Jan to 1<sup>st</sup> Feb 2015. This event was run under the auspices of a RAFMA climbing meet and used their safety management system. Individuals attended some or all of the week long serial. The weather made finding suitable and safe climbing objectives very difficult.
  - c. **Alpine training.** After discussion with CI, JSMTIC INDEFATIGABLE it was decided to keep expedition training and Joint Services Alpine Meet (JSAM) as separate activity. Exped training took place during the period 11 – 26 July 2015. Some expedition personnel joined in the middle weekend having attended JSAM. This was run as a separate expedition, under a separate JSATFA and HR&R by Maj Chris WRIGHT. This was a very well run expedition and Maj WRIGHT did a very commendable job securing funding which allowed the expedition to be run at acceptable levels of personal contribution. Climbing took place around Sass Grund in the Valais Alps.
6. **Key lessons identified;**
  - a. Due to changes in personal circumstances, work etc only about 50% of the team had

actually attended this weekend. Leaders must have realistic expectations of the outcome from the time and effort invested in this process.

- b. Early branding meant that the expedition appeared well organised at this early stage and even made money on T shirt sales.
- c. The support (at no cost) from JSMTTC INDEFATIGABLE is very gratefully acknowledged. The expedition charged a small fee for this selection event (£25 for the weekend) which subsidised future training.
- d. Rothiemurchus provides an excellent base for winter mountaineering and facilities to be able to deliver indoor training in bad weather are useful.
- e. Access via the long track to the lodge is challenging and snow chains are required for 2WD vehicles.
- f. The cost of using Rothiemurchus lodge (£15 per night) is a relative disincentive.
- g. Separate organisation for this training was essential to allow the expedition leader to concentrate on the increasing workload of the main exped.
- h. Although Switzerland is very expensive we were able to use service transport and camp in the valley. Being registered at the campsite entitled participants to free uplift in the valley which helped reduce the overall cost.

7. Overall trying to establish time to get the whole team together for further formal training proved very difficult. The training conducted had allowed everyone involved to be qualified to at least AMF and to be seen climbing by the expedition leader. The lack of any further formal training was offset with the use of social media (Whatsapp and Facebook) to keep a level of competitive banter going and generate active discussions on kit and equipment. Several team members met up informally from time to time to train together.

### **Main Expedition phase timelines**

8. The main events of the expedition are outlined below;

- a. 06 Nov 15 – MT and HADT Loan Pool Stores initial submission.
- b. 04 to 08 Jan 16 – Loan Pool Stores collection window (MT and HADT).
- c. 15 Jan 16 – Trekking teams Loan Pool Stores submission.
- d. Early Feb 16 – Airfreight sent via BFPO.
- e. 01 Mar 16 – Bulk of freight in Kathmandu.
- f. 17 Mar 16 – Pre-expedition launch event HMS PRESIDENT.
- g. 25 Mar 16 – Final preparation/packing
- h. 27 Mar 16 – Advance team outbound travel from UK.
- i. 30 Mar 16 – MT/HADT outbound travel from UK.
- j. 13 Apr 16 – 27 Apr 16 – Trek teams 03-10 outbound travel from UK.
- k. 30 Apr 16 – HADT inbound travel from Kathmandu.
- l. 30 Apr 16 – 18 May 16 – Trek teams inbound travel from Kathmandu.
- m. 30 May 16 – Main team inbound travel from Kathmandu.
- n. 01 July 16 – Freight begins to return from Kathmandu (via BGN)

- o. 17 Jul 16 – PXR submitted to HMS TEMERAIRE.
- p. 11 Aug 16 – Loan Pool Stores return date.
- q. 7 Dec 16 – Post expedition presentation, RGS, London.

### **Expedition Launch Event**

9. This took place at HMS PRESIDENT in central London and was well attended by around 150 key sponsors, senior officers and expedition members. The venue was provided free of charge including a bunk room for expedition members to use on the night.

10. **Key lessons identified;**

- a. The venue is superb and the Commanding Officer and his team very helpful and supportive.
- b. Any presentation for an audience of more than 30 has to be given in the drill hall using a projector and screen which does limit the audiovisual impact.
- c. HMS PRESIDENT's URNU cadets provided an excellent service staffing the bar until late into the evening.
- d. HMS PRESIDENT is in a residential area and this needs to be respected when entering and leaving the facility in quiet hours.

### **Selection**

11. The very busy deployment and high readiness plots created difficulty with team training and preparation. This had a disproportionate effect on the junior members of the team but is an unavoidable problem. Involvement of the trekking teams enabled much greater participation at unit level with a greater number of personnel.

12. An initial selection weekend was held in September 2014 at JSMTIC Indefatigable. The support of the Commanding Officer was instrumental in making that a successful event with some AT based activity and a formal interview process. Approximately 60 personnel attended this weekend from which a squad of 36 were chosen.

13. After team training in the Alps (Jul 2015) the final choice of 12 (MT) plus 12 (HADT) was made. Due to inevitable changes with professional and personal changes there was only a very small reserve list left after the Alps training and last minute replacements were required to be drafted in to the team. Future leaders should aim to have at least twice the personnel they require for the final team if selecting more than 12 months out.

### **Expedition Execution**

14. The in country logistics were provided as a bespoke package by Far Frontiers Expeditions. Several meetings between the company owner and exped leader took place in the UK to provide a package fit for the aims of AT and the research. In the end the extensive knowledge and flexibility of Far Frontiers Expeditions was absolutely key to the expedition's success.

15. Flights were booked outside of Defence Travel in accordance with 2013 DIN 01 – 108 Utilisation of Defence Travel. Authority to book outside of DT was promptly provided by email. The justification for this was based on the number of different units involved and the need to secure early group bookings to ensure the expedition timetable could be maintained. Tickets were booked through Laura Kitson at Travel Counsellors who provided an excellent bespoke service and would be very highly recommended to future groups ([laura.kitson@travelcounsellors.com](mailto:laura.kitson@travelcounsellors.com), 01543 277297, 07877013901).

16. Trekking teams were responsible for booking and funding their own flights. Most managed to do this at public expense and via Defence Travel.

17. Overall the complex administration and management of the various teams proved more challenging than hoped. All three services took a subtly different view on the requirement for individual trek JSATFAs and understanding the concept of the overarching JSATFA and the fact that the overall risk was owned by the RN. This was further complicated by the expedition leader being a naval officer but working within an army unit as part of Joint Force Command. The expedition leader is very grateful to the Commanding Officer of DMG(N) who took a pragmatic view to the duty required of him as the Delegated Duty (risk) Holder and was happy to take on this responsibility which was then delegated to the expedition leader.

18. Trek team leaders took responsibility for the conduct of their own teams, completing daily risk assessments and an expedition log. Overall teams managed to stay together with very little change in itinerary. Where individuals were deemed unfit (for whatever reason) to continue these personnel were escorted by a suitably qualified leader over difficult terrain or a local guide over known, straightforward, terrain to meet other trekking teams at overnight camps. This occurred with two individuals from trekking team 6 descending from Japanese BC area and two individuals from TT06 and TT08 who had an extra rest day at Dhaulagiri BC and were then escorted to meet the rest of the team in the Hidden Valley. TT06 split in the Hidden Valley with 3 less well acclimatised members trekking out after one day. These three were supported by the doctor from Hidden Valley camp (AML qualified) and a local guide.

19. Trekking teams have produced their own PXR's and the points from these have been considered in this report.

## **Leaders**

20. Each trekking team was accompanied by summer mountain leaders maintaining ratios in accordance with JSP 419. At the higher altitudes any precipitation will fall as snow and some teams experienced whit-out conditions in the Hidden Valley. No teams required the use of axe or crampons on any part of the circuit. The section of the circuit around Italian base camp is exposed traversing on loose moraine and could be prone to stonefall. Leaders were advised to ensure teams were spaced and wore helmets.

21. Climbing teams worked on alpine ratios from JSP 419 and the experience of a number of the team in having climbed in greater ranges and on fixed ropes before. This balance of experience and qualification is essential to be able to operate in the greater ranges using fixed ropes and camps at high altitude which is outside of any taught military scheme.

22. Qualifications are highlighted in the team nominals attached as annex A

## **23. Key Lessons Identified**

- a. The Dhaulagiri circuit is very challenging and although MLS is considered a suitable qualification, future leaders should have expedition and winter experience.
- b. A number of aspects of Himalayan climbing are not covered in the Alpine mountaineering scheme in JSP 419 and qualification needs to be balanced by experience.

## **Expedition Itinerary**

24. A detailed itinerary for the trekking teams and for the MT/HADT is at annex B.

25. The trekking teams trekked the Dhaulagiri Circuit in a clockwise fashion (from the road head at Dharbang) taking approximately 3 weeks from UK – UK.

26. The MT/HADT trekked into the Hidden Valley (5140m) from Marpha (anticlockwise around the circuit). This gained height very quickly (camps at 2750, 3600, 4100, 5140m) but had the advantage of being more remote (less risk of medical problems from hygiene issues) and being at better altitudes to acclimatise from the road head. Initially the planned HADT itinerary was 31 days which would have incurred an extra cost of \$1440 for the expedition versus a 30 day itinerary. The result of the 24 hour delay in the flight from the UK was to reduce this.

27. **Key Lessons Identified;**

- a. Nepalese tourist visas are for up to 30 days (USD 40) or up to 100 days (USD 90). This should be considered when booking itineraries.
- b. The trekking teams itinerary provided adequate time for acclimatisation although the rest day at the Hidden Valley camp was later omitted as experience suggested there was little recovery in this high and inhospitable camp. Further detail of the day to day activities can be obtained from the expedition blog ([www.dhaulagiri2016.com](http://www.dhaulagiri2016.com)).

### **Communications/Power**

28. The expedition had complex requirements for power and communications equipment to facilitate the research aims and maintain comms between teams on the mountain. The expedition comms plan is at annex C. A daily SITREP was sent to the Defence Section at the Embassy in Kathmandu.

- a. **Power.** Due to the importance of power to the research aims the expedition had a variety of power sources available. This included Honda i20 and i10 generators (provided free of charge from Leeds Beckett University), solarpod 240 (6) and 1000 (1) watt solar batteries ([www.sunbirdsolar.com](http://www.sunbirdsolar.com)) with matched solar panels and powertraveller solar gorillas and powermonkey extremes ([www.powertraveller.co.uk](http://www.powertraveller.co.uk)). All of this equipment functioned very well, in particular the solarpod 240 system provided excellent, reliable power which charged quickly. This system had a 400W, 240v inverter as well as USB and 12v sockets and is recommended for future expeditions carrying laptops, BGANs etc.
- b. **Comms.** The expedition comms plan used VHF for comms between main/HADT climbers and basecamp, email/voice via Inmarsat for communication between camps at Italian BC, Hidden Valley and Dhaulagiri BC and email/voice for communication from Dhaulagiri BC to UK/Kathmandu. The expedition received generous support from Inmarsat who loaned equipment and provided free data and voice services. In total the expedition received the loan of 6 sat phones and 4 BGANs from Inmarsat, 2 satellite phones were provided from HQ Land and 2 from the Defence Section at the British Embassy Nepal to provide each trekking team with a sat phone.

Despite the J6 lead for the expedition (Capt Marcus Levens, Royal Signals) having spent considerable time in discussion with Inmarsat to ensure there was a clear satellite visible from all camps the reality on the ground was different. The satellites were obscured from Dhaulagiri base camp and most of the Magadi (Italian Base camp area) valley. Perseverance from Capt Levens in terms of building a 5m tower and communications with Inmarsats UK Vice President resulted in the array of one satellite being repositioned to cover our location. This enabled some comms by voice and good comms via email throughout the time spent at Dhaulagiri base camp. The embassy phone operated on the Thuraya network and had a much stronger signal at Dhaulagiri base camp. The main team obtained the Thuraya phone from the second trek team (RM band service) as they passed base camp which gave further resilience.

GSM coverage was available from Yak Kharka on the Kali Kandaki side of the circuit and to Jugepani on the Magadi valley side. To maximise coverage both NCell and NTC simm cards are required.

The expedition leader and one of the trek leaders both owned personal SPOT locator devices (www.findmespot.com). These had been pre-programmed to send messages to the expedition email account and to the Defence Section at the embassy. This proved a very useful, lightweight and cost effective back up.

29. **Key lessons identified;**

- a. Multiple options are required in ensure a robust comms plan (including cards for different satellite and GSM networks)
- b. A “map recce” of satellite availability does not necessarily reflect the reality on the ground
- c. Licences were required for the BGAN terminals and VHF handsets but no permit required for the sat phones
- d. SPOT locators were a very useful backup and highly recommended
- e. The plan for power provision must match the comms power requirement
- f. Solarpod solar batteries and panel provided an excellent and reliable power source throughout the majority of the expedition
- g. Lithium batteries with an output of greater than 160W are not permissible as luggage on passenger aircraft and must be freighted as hazardous air cargo

**Media**

30. To ensure passage of key information to both internal and external agencies the Media plan was a key part of the expedition. NCHQ Media in conjunction with Directorate Defence Communication supported by tri-service media cells managed distribution of media content internally and externally whilst the expedition was deployed and on return.

31. To further support this BSDMRE established a website (including blog) and social media sites including Facebook and Twitter. These were updated live whilst deployed and provided content for NCHQ and DDC media cells to exploit, with selected material released to expedition sponsors. BSDMRE sent out a press release (annex D) prior to deploying ensuring all Media POCs, sponsors and interested parties were informed of intentions and updates.

32. The initial team selection included an RAF PRO who was selected to join the team to fully exploit the media opportunities. This individual had to withdraw from the expedition on medical grounds approximately six months before deployment. A key lesson identified for future expeditions is that an expedition Media representative with previous media training and experience should be selected from the Teams<sup>1</sup> early in the planning process to engage with and understand both internal and external Media streams. Ideally this individual would have an understudy. If necessary the rep should receive training on Media management as part expedition preparation and also consider a UK based expedition Media representative to collate and distribute media for the expedition as a whole.

33. Where connectivity allowed, internet and satellite phones were enabled utilising BGAN equipment. These provided the means for conducting live voice and video interviews and distributing media over the internet. Satellite phone numbers, Skype and email addresses were distributed to Media POCs before deploying. A selection of terminals connected to the BGANs, provided the capability to upload data (video, voice, and image files) to a shared space<sup>2</sup> for distribution to interested parties and Media POCs. Noting that this was often limited due to bandwidth restrictions and intermittent connectivity due to isolation and weather. The equipment was tested in the UK and data and voice communications were sent before deploying. These were re tested on arrival in Nepal before deploying on the ground.

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<sup>1</sup> HADT and MT selected 1 rep and trekking teams were responsible for their own media engagement

<sup>2</sup> Google Drive – Media POCs were given access to high resolution photos and videos which could not be sent by email.

34. A professional cameraman<sup>3</sup> deployed with the climbing teams for the duration of the expedition and was responsible for collating and editing material prior to distribution. He deployed with a suite of media equipment including mirror-less SLR cameras, a DGI Phantom 4 drone, Go Pro Hero 4 camera and an editing lap top computer compatible with the expedition comms suite. He was in close contact with the Development and Main climbing teams throughout. For those instances where he was not able to follow the main climbing team a Go Pro camera was forward deployed supported by personal cameras.
35. The media recording and editing equipment relied heavily on regular re charging and placed a significant burden on solar recharging batteries and often required a generator in support.
36. The expedition attracted significant Media interest particularly through Social Media channels, local news channels and Unit Media cells. Before leaving the UK BBC South Today covered the medical implant procedures at Poole hospital and BBC Look North conducted interviews with the exped leader and members, resulting in approximately 6 minutes of prime TV coverage. Whilst in Nepal several interviews were conducted and broadcast through BBC Radio (York, Tees, Sheffield) and BFBS. On return to the UK, BBC Radio Tees Breakfast covered a live interview with the exped leader. Additionally several presentations took place to variety of audiences including local schools, BBraun, Medtronic and the Extreme Medical conference in Birmingham.
37. Articles have also been submitted to the RM Globe and Laurel monthly publication and the Navy News which are expected to be published in the August editions. Tri Service Members of the expedition have also published articles in their local Unit journals.

### **Key Lessons Identified**

- a. Standard laptops worked with no issues at up to 5100m
- b. Early engagement with Defence Media in order identify relevant POCs is key.
- c. An expedition Media representative with previous media training and experience should be selected from the Teams<sup>4</sup> early in the planning process.
- d. Distribution of media with limited bandwidth requires careful co-ordination.
- e. The burden of equipment for media (comms/photography) in terms of power and portorage is important to recognise

### **Finance**

38. With a forecast budget of almost £300K, BSDMRE 2016 was an ambitious undertaking, with an order of magnitude far in excess of what would be considered the norm for AT. It is for that reason that these expeditions are run on a quadrennial and Joint basis. We sought funding from a wide range of public, non-public and charitable sources, in addition to significant personal contributions from expedition members. Commercial sponsorship was also sought but with little success. The funds were banked with Service Funds at RAF High Wycombe who provided an excellent service and were content to accept payment from Public sources to be transferred into the non-public account.

### **Division of expenditure**

39. A detailed breakdown of expedition expenditure is at Annex E but the major areas of expenditure were as follows:

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<sup>3</sup> Army Reservist

<sup>4</sup> HADT and MT selected 1 rep and trekking teams were responsible for their own media engagement

- a. **Flights to/from Nepal.** Due to the multi-unit nature of the expedition, flight costs would have differed widely among personnel, had we adhered to the HRG bookings process. Dispensation from DE&S allowed us to source the cheapest flights possible by booking en masse through Travel Counsellors. The flexible nature of the bookings allowed us to book early (at the cheapest rate) and make name changes up until weeks before departure.
- b. **Peak permits.** The Government of Nepal levy a mandatory charge for visitors trekking and climbing in Nepal.
- c. **Equipment.** While the bulk of equipment requirements were met from Bicester Loan Stores, there was a requirement to source some items such as fixed rope and high altitude tents from within expedition funds. Some equipment was also kindly donated by commercial sponsors, namely: Montane and DMM.
- d. **Insurance.** Insurance cover had to be provided to cover equipment losses and to ensure rescue/repatriation costs in the event of emergency. While in theory, the MOD should cover rescue costs for personnel on duty, the reality is that in Nepal rescue helicopters are unlikely to launch unless proof of insurance is provided.
- e. **Freight costs.** Freight costs were kept to a minimum by use of the BFPO system to send items to British Ghurkhas Kathmandu.
- f. **Visas.** In addition to trekking and peak permits, there is a requirement for all visitors to Nepal to gain tourist visas.
- g. **Radio permits.** Radio permits are mandatory in Nepal.
- h. **Launch event.** The expedition launch event took place at HMS President on 17 March 2016. Expedition funds paid for refreshments at the event but the venue hire came at no cost.
- i. **Communications.** The expedition website was commercially designed and hosted at cost but SATCOM equipment and bandwidth costs were kindly covered by commercial sponsors, namely INMARSAT.
- j. **Tips/bonuses.** It is customary and expected to pay tips to porters, base camp staff and mule herders in Nepal. Summit bonuses are also paid to Sherpas.
- k. **Food and fuel above base camp.** While our agent, Far Frontiers, provided fuel and food at base camp, we were required to provide our own food<sup>5</sup> and fuel above base camp.
- l. **Far Frontiers.** Far Frontiers are a commercial agent, that provided our in-country support in Nepal, including: in-country travel, accommodation, in-country movement of expedition freight, porters, sherpas, real life support at base camp, food and fuel at base camp and rescue coordination. The majority of expedition costs were sunken into the fee charged by Far Frontiers.

## Sources of funding

40. A diverse range of funding was sought and the detail is provided at Appendix 2. The major funding sources were as follows:

- a. **Duty travel.** Travel at public expense was sought from all respective chains of

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<sup>5</sup> Dehydrated rations.

command for flights to and from Nepal. In the majority of cases, funding was provided and there were no difficulties encountered transferring the public funds into a non-public account.

- b. **CILOR.** CILOR (with high altitude supplement) was provided, in most cases, from respective Units to offset food costs on the Expedition.
- c. **Public funding.** Applications for public-funding AT grants were submitted to all 3 single Services. While the Army and Navy have central public funding to contribute towards AT, the RAF does not. 22 Trg Gp, however, did provide funding for RAF personnel, which together with Unit grants made public funding broadly equitable across the Services.
- d. **Non-public funding.** Applications were submitted to the Army Central Fund, RAF Central Fund (Sports Lottery), Army Sports Lottery, RN Sports Lottery, RAF CT, RNRMC, Nuffield Trust, JSET, Berlin Infantry Brigade Memorial Trust Fund, Ulysees Trust and single-Service Mountaineering Clubs. Funding was forthcoming from all except Nuffield and Berlin Infantry Brigade Memorial Trust. JSET awarded a grant but dictated that it was to off-set the costs for the trekking teams who sat within a separate financial plan. Of note, the RNRMC provided a total of nearly £139.5K and without this funding, the expedition would have been unaffordable.
- e. **Personal contributions.** Members of the Main Team each made a contribution of £2000 while Development Team members each paid £1500. If spare funds are available once the final expedition costs are known, there may be scope to refund a small % of personal contributions.
- f. **Commercial sponsorship.** We worked hard to seek commercial sponsorship in order to reduce the burden on public and non-public funds. We approached in excess of 15 large Defence contractors but failed to attract significant interest. An initial launch event aimed at courting sponsors was planned to take place but insufficient interest was shown to make the event cost effective. We had to cancel with one month to go which cost us deposits for venue hire and catering. Only one financial sponsor was forthcoming – BBraun Medical Supplies to the sum of £6000.

41. Despite the significant cost of nearly £300K, BSDMRE 16 was affordable and came in on budget. This was due, in the main, to the generous grant provided by the RNRMC. Each trekking team raised iro £3500 per team member.

#### 42. **Key Lessons Identified**

Other factors which helped affordability and are recommended for consideration in future were as follows:

- a. Early flight bookings with Travel Counsellors.
- b. Use of BFPO to transport freight.
- c. Unit (Public) funding for air travel and CILOR.
- d. Significant personal contributions.
- e. Early applications to a large number of Service charities – a generic business case was written to support applications.
- f. The greatest difficulty lay with attracting commercial sponsors. Many companies were keen to offer equipment at no cost or with generous discounts but only BBraun Medical Supplies offered financial support. It is recommended that the search for commercial sponsors to support 2020's expedition should begin at the earliest opportunity and potential sponsors should be invited to the BSDMRE 16 post expedition event in Dec 16.

## Equipment

43. The expedition used a range of equipment from AT loan stores, personal kit and equipment provided by sponsors.

- a. **General.** The expedition logistics plan was shaped by the use of Far Frontiers to provide in-country movement of equipment and basecamp support which included the provision of tentage and feeding. There was a requirement to have all non-accompanying team equipment to be moved to Nepal one month in advance of the expedition arrival. Movement of expedition stores from the UK to Nepal was also effected by a fuel crisis and strike action in India, which meant that sea-freighting via Purple Gate was unavailable. Expedition stores were provided largely through Bicester. Individuals were equipped with a mixture of personal mountaineering equipment, specialist HA equipment (largely boots, down suits and sleeping bags) from Bicester and a few items provided through sponsorship arrangements (shell clothing and some mountaineering hardware). The expedition purchased freeze-dried rations and sundries were provided by individuals for use above basecamp.
- b. **SoM Outbound.** The movement of expedition stores was broken down into 'accompanying equipment' and 'freight'. Flights were booked with Etihad to ensure that individuals had a 23kg hold baggage allowance and 10kg of hand luggage, which was sufficient for all personal mountaineering and travel equipment. Several additional bags were paid for to cover last-minute additions to group kit as well as delicate items such as laptops and comms kit. The group stores consisted of the equipment for use above basecamp and included tents, freeze-dried rations, stoves and climbing equipment (fixing kit/ropes). The freight was packaged into blue barrels (mixture of 60L/120L provided from Bicester) and sent through the BFPO system from a civilian post office to British Gurkhas Nepal in Kathmandu (c/o QM). The cost per kilo was roughly £1.33, with almost 900kg dispatched in 27 barrels. The freight was collected from British Gurkhas Nepal by the staff of Far Frontiers and transferred to their store, prior to onward movement to the respective basecamp locations.
- c. **SoM Return.** A similar process was repeated in reverse. Group stores were returned at the end of both the HAD phase and the Dhaulagiri phase. The Far Frontiers logistic plan allowed for the group stores to return to Kathmandu at the same time as the personnel recovering, meaning that they could ensure that the necessary admin for dispatch could be completed prior to them leaving Nepal. Returning group stores were administered by an appointed QM for the HADT and an appointed QM for the Main Team.
- d. **Lessons/Advice.** Equipment provided through sponsorship arrangements. The pros and cons of approaching companies for sponsorship and accepting equipment must be carefully considered. There are definite advantages of having certain items that are susceptible to damage or loss and do not need to be accounted for such as ropes and climbing hardware. The provision of items intended for personal use such as clothing and mountaineering equipment is fraught with issues relating to acceptance of suitability and correct fit and must therefore be closely considered. There are benefits to having a 'branded' feel to an expedition of this nature, but it must be planned that interaction with sponsors will become a time-consuming activity. Equipment provided from Bicester. Generally, the equipment provided from Bicester was excellent, both in terms of suitability and condition. The only problem experienced was with the Mountain Hardware Trango tents which were in poor condition. They had been used on at least one 8000m peak expedition several years ago and had suffered from UV degradation. The tents were all inspected prior to deployment and appeared to be workable. However, on the expedition it became clear that we had been provided with a 'mish-mash' of two- and three-man variants which have subtle differences that render them incompatible.

Expeditions should be mindful of the 60-day timeline for Bicester applications and ensure that there is sufficient time allowed for processing both before and after; ideally three-months either side.

**In-Country Logistics.** The requirement imposed by Far Frontiers to have the equipment in-country, one-month ahead of the expedition arrival represented a planning challenge and a considerable (albeit not insurmountable) amount of additional coordination in the UK. Undoubtedly the intention was to have the flexibility to move the equipment as cheaply and efficiently as possible and also to have basecamps established well-ahead of our arrival. The reality was that much of the equipment had not moved beyond the roadhead due to weather conditions. It is useful to have the ability to finalise administration in-country. **Movement of equipment to Nepal.** The initial plan for stores movement was to use Purple Gate at Bicester, which would have meant that items would have been moved by sea freight to Calcutta and then transported overland through India. This process is free-of-charge although approximately three-months needs to be allowed for the journey. It is also less constrained in terms of dangerous air cargo (batteries, liquids, gas cylinders etc.) and compliance with packaging dimensions and weights. However, in early 2016 this route was blockaded.

#### 44. **Key Lessons Identified**

- a. Bicester demands require 60 working day lead in
- b. Time should be allowed to inspect loan pool kit both in UK and in Nepal
- c. Offers of sponsorship, in terms of clothing and equipment, need to be carefully considered.

#### **Medical**

45. The overwhelming number of participants completed the Dhaulagiri circuit on the planned itinerary. The incidence of mild, self-limiting acute mountain sickness was around 20% (in line with expectation and other expeditions to similar altitudes). Four altitude related casualties requiring helo evacuation, one non altitude related casualty required evacuation by helo. Three individuals failed to complete the circuit and had to back track after failing to acclimatise ivo Japanese BC, one after injury to a foot. One of the HADT withdrew from the expedition (to UK) early due to illness. Four of the main/HADT required descent early in the expedition primarily as a result of viral illness.

46. The Commanding Officer DMG(N) was given authority to order the medical items required to stock all three camps (Italian BC, Dhaulagiri BC and Hidden Valley camp). These items were ordered five weeks before departure but only around 50% had arrived by the time the team left for Nepal. The shortfall was made up with sponsorship from Lifesystems who supplied each team and each camp with a mountain leader pro first aid kit and by purchasing drugs in Kathmandu. It is worth noting that it was very straightforward to purchase quantities of nifedipine, dexamethasone and acetazolamide in Kathmandu and this was very significantly cheaper than trying to buy the drugs (on private prescription) in the UK.

47. The medical officers at Dhaulagiri BC and in the Hidden Valley were busy treating a number of expedition members (and passing trade) with a range of altitude and non-altitude related illnesses. Symptoms peaked on ascent to the Hidden Valley with at least one episode of cerebral oedema requiring helo evacuation. Interestingly the casualty was later found to have a cyst on her brain which, although not harmful in day to day life would have predisposed her to developing HACE. During this episode 4 other team members developed symptoms of severe AMS and/or exhaustion demonstrating how important team management is during casevac procedures.

48. Traveller's diarrhoea was a relatively frequent occurrence despite the best efforts of individuals and the trekking support company to maintain hygiene. Due to the remote nature of the trail early treatment with antibiotics (ciprofloxacin or azithromycin) and antimotility agents (loperamide) was judged essential. Failure to comply with this regimen led to one individual becoming very dehydrated and requiring helo evacuation.

49. Episodes of viral illnesses and other minor ailments occurred sporadically especially amongst the main team. This situation was exacerbated by Dhaulagiri base camp becoming a bit of a social hub (largely due to having Wifi) and trekkers passing through on a regular basis.

50. Getting medical staff released for expeditions such as this is problematical. When in training grades it becomes very difficult for doctors to be released yet this sort of expedition both generates a need for medical care for service personnel on duty and also provide a unique experiential opportunity. For BSDMRE the seniority of the doctors involved in both the exped and the research facilitated release of appropriate staff. This may prove more difficult for other expedition leaders and long lead in time should be allowed and a medical sponsor of senior rank sought.

51. A more detailed medical annex is attached to this PXR (annex E)

52. **Key Lessons Identified**

- a. The Dhaulagiri circuit is particularly remote and requires a robust medical plan
- b. Ordering drugs/disposables through the military system takes a considerable time and would prove very difficult for a non-medical officer.
- c. Drugs can be purchased in Kathmandu, most without prescription of any kind.
- d. An insurance policy remains the only way to reliably summon a helicopter
- e. Splitting teams in the event of illness or slow acclimatisation would have been very difficult without the large number of teams taking part in BSDMRE.
- f. Provision of a portable hyperbaric chamber and means of summoning an emergency helicopter should be considered mandatory for the Dhaulagiri circuit.

**Miscellaneous**

53. The following additional points are presented for the consideration of future leaders.

- a. **Weather/forecasts** – weather forecasts were accessed via the internet from the Joint Operational Meteorology and Oceanography Centre (JOMOC) JOMOC@metoffice.gov.uk, from mountain forecast.com (<http://www.mountain-forecast.com/peaks/Dhaulagiri>) and from meteo-expeditions (<http://www.meteoexploration.com/forecasts/Dhaulagiri/?lang=en>). None of these proved to be very accurate for subtle changes although good enough to detect any major changes in the weather pattern. Throughout the exped the weather stayed fairly consistent with morning sun and clear skies with cloud building from the valleys during the afternoon. Later in the expedition forecasts were supplied by a Nepalese forecaster which proved more accurate with regard to wind speed and were supplied by email. Due to the comms problems experienced we were unable to pass Met reports down to trekkers but all trekking teams arriving at Dhaulagiri BC received a brief on recent weather and forecast for the Hidden Valley area which was essential.
- b. **Insurance** - 2015DIN01-185 refers to the provision of insurance for AT. Although the DIN is very clear that those on AT are on duty and covered by the MoD for medical and rescue expenses no “policy note” is provided for this. For this reason the expedition leader took the view that purchasing an insurance policy was the pragmatic solution. The “catch 22” is that recreational mountaineering policies (such as BMC) do not cover those working (ie on duty). A pragmatic and affordable policy was provided by Richard Dorman at Insignia Underwriting, this covered all climbing and trekking teams as well as loan (military and civilian) equipment.

**Summary;**

54. The combination of the multiple trekking teams and the climbing teams made the expedition challenging to organise and run but led to huge research opportunity and allowed flexibility and enhanced safety on a very challenging trek. Attempting an 8000m peak and trekking in this environment represents an inspiring challenge to promote AT within the military.

A handwritten signature in black ink, consisting of a stylized, cursive letter 'A' followed by a long horizontal stroke that tapers to a point.

Adrian Mellor  
Surg Cdr RN  
Expedition Leader

MT AND HADT NOMINAL ROLLS

MT

No.	Service	Service No	Rank	Name	Surname	Unit	AT Qualifications
1	Royal Navy	C035201F	Surg Cdr	Adrian	Mellor	DMG(N)	MLW, WCI, AMI <b>Instructor</b>
2	Royal Navy	30051681	Surg Lt	Josh	Bakker-Dyos	INM	JSMLS, AMT, WMT <b>Expedition Medical Officer</b>
3	Royal Marines	30010210	Capt	Matt	Webster	AFCO London	SL1
4	Army (R)	551784	Capt	Matt	Howard	SCOTS	JSRCI, ASL, WMT & AMT SPA & MLS, MIA training
5	Army	25181795	Capt	Marcus	Levens	30 Cdo	SML, AMT, RML
6	Royal Marines	P064911R	Capt	Richard	Mackie	CTCRM, Lympstone RM	RM MLO (Ice flip +) <b>Instructor</b>
7	Royal Marines	P059185H	Sgt	Lloyd	Williams	30 Cdo	AMT, RCS, REC
8	Royal Air Force	8424271B	Sqn Ldr	Jonathon	Percival	DMS WHITINGTON BARRACKS	AMI, WCI, WML, JSRCI <b>Instructor</b>
9	Army	25147389	Lt	Graham	Stephenson	103 Regt RA	Advanced JSMEI, AML <b>Instructor</b>
10	Royal Air Force	8300176H	Grp Capt	Dave	Tait	RAF HIGH WYCOMBE	ML(S), ML(W), JSRCI, AML <b>Instructor</b>
11	Army	558255	Maj	Chris	Wright	ROYAL IRISH	WCL, AML <b>Instructor</b>
12	Army (R)	30114285	Pte	Sandro	Gromen-Hayes	131 Cdo	WMF, AMF <b>Photographer</b>

HADT and Research team

Team	No.	Service	Service No	Rank	Name	Surname	Unit	AT Qualifications
HADT	1	Royal Navy	D258283T	POPTI	Marc	Dowling	DPHC(SW) at BRNC	MLT, AMF
HADT	2	Royal Navy	C040329M	Lt RN	Chris	Evans	Maritime Warfare Centre Collingwood	MLS / WMP / WCP / RCL / AMT. <b>Leader HADT when teams separate</b>
HADT	3	Royal Navy	30111995	Sub Lt	Robert	Gillman	RNAS Culdrose	JSRCI, AMT+AKL, MLT, WMF
HADT	4	Royal Air Force	8291010C	Sqn Ldr	Dan	Graves	SGD, DMS WHITTINGTON BARRACKS	MLT, AMF
HADT	5	Royal Air Force	P8425368	Flt Lt	Andy	England	RAF Honington	
HADT	6	Army (R)	545998	Maj	Al	Mason	10 AEC Tidworth	AML <b>Instructor</b>
HADT	7	Army	25104771	SSgt	Ben	Powell	16 SIGNAL REGIMENT	JSRCL, JSMEL(S), WMF, WCF, AMT <b>Instructor</b>
HADT	8	Army	30132708	L/Cpl	Elisabeth	Robinson	1AMR	AMF, WMF, RCF
HADT	9	Army	25031424	Cpl	Shawn	Stock	3 PARA	RCF, WMF, WCF, AMF, SF1, MFA. <b>Medical Lead HADT</b>
HADT	10	Royal Air Force	5208792P	Flt Lt	Stu	Quinn		AMF, MLS <b>Instructor</b>
HADT		Royal Marines	P053358Y	CSgt	Rob	Norris	45 CDO	WCL, MLW, AML <b>Instructor</b>
HADT	12	Royal Air Force	8701678M	Sqn Ldr	Gordon	Henderson	24AF San Antonio, RAF Exchange Program	JSMEL(W), JSMEL(Adv), SML, JSRCI, AMF
HADT	13	Army	542155	Maj	David	Holdsworth	AMD Support Unit	Transfers to research team <b>MO, I/C Treks</b>
Research	1	Army	30065269	Maj	Caroline	Newman	AMD Support Unit	<b>MO</b>
Research	2	Army	30185679	Lt	Richard	Cruttenden	AMD	
Research	3	Royal Navy	550808	Surg Lt Cdr	Phyl	Scott	INM	AML, MLS, RCL, WMP <b>MO</b>
Research	4	Royal Navy	30094277	Lt	Emma	Vincent	DMG(S)	
Research	5	Army	30195564	Capt	Matt	Howard	1 Rifles	<b>MO</b>
Research	6	Royal Navy (R)	C038498W	Surg Cdr	Andy	Brown	HMS Vivid	<b>AML</b>

Team No	Service	Service No	Rank	Name	Surname	Unit	AT Qualifications
TT03	Royal Marines	30008333	Musn	Jonathon	Salmon	RM Band CTCRM	MLS, First aid, REC first aid
TT03	Royal Marines	P046483B	Bd Cpl	Quentin	Brown	RM Band Scotland	MLS, First aid, REC first aid
TT03	Royal Marines	30094492	Musn	Katherine	Beard	RM Band Portsmouth	REC first aid, RN first aid 2
TT03	Royal Marines	30055192	Bd Cpl	Lucy	Chappell	RM Band Portsmouth	REC first aid
TT03	Royal Marines	P060874X	Musn	Alastair	Ham	RM Band Portsmouth	REC first aid
TT03	Royal Marines	30125431	Musn	Christopher	Hunt	RM Band Plymouth	REC first aid
TT03	Royal Marines	30055377	Musn	Kimberley	Leighton	RM Band CTCRM	REC first aid, RN First aid 2
TT03	Royal Marines	30055376	Musn	Liam	O'Neill	RM Band Portsmouth	REC first aid, RN First aid 2
TT03	Royal Marines	P063956X	Musn	Matthew	Pym	RM Band Plymouth	REC first aid
TT03	Royal Marines	P066032Q	Musn	Jonathon	Scott	RM Band Plymouth	REC first aid
TT03	Royal Marines	P066036F	Musn	Simon	Topper	RM Band Plymouth	REC first aid, RN First aid 2
TT03	Royal Marines	30125433	Musn	Benjamin	Worsfold	RM Band HMS Collingwood	SMF, REC first aid
TT04	RAF	2641268L	Wg Cdr	Chris	Rowley	DMRC	MLS (Instructor) In-country Expedition Leader
TT04	RAF	30000729	Sqn Ldr	Alex	Bacon	RAFC CRN	MLS, ALS, WML, MLW (Instructor) Medical Officer /Dip Altitude Medicine (Exped MO)
TT04	RAF	30177658	Cpl	Ash	Layden	RCDM - Oxford	SMF Nurse
TT04	RAF	30218742	Cpl	Sarah	Hulsey	DMRC	No Q's/ Novice Nurse
TT04	RAF	30228941	Cpl	Hannah	Pringle	DMRC	No Q's/ Novice Nurse
TT04	Army	30205842	Capt	Morag	Patterson	DMRC	No Q's/ Novice Physiotherapist/ BLS
TT04	Army	30160223	Capt	Kat	Rye	DMRC	No Q's/ Novice Physiotherapist/ BLS
TT04	Army	30041778	Lt	Victoria	Maymon	DMRC/Aldershot	No Q's/ Novice
TT04	Royal Navy	D260476B	MA	Damien	Matthews	HMNB Clyde, Faslane	SMF, MLT (training)

							Team Medic/ winter warfare training/ BLS
TT04	Royal Navy	30181671	LNN	Diane	Izatt	RCDM - Birmingham	SMF Nurse
TT05	Royal Navy	D204829R	WO1	Derek	Scott	RNAS Yeovilton	Trek Leader TT05SML/First Aid
TT05	Royal Navy	30045842	Lt	Emma	Charters	NWDHQ	First Aid/MLT
TT05	Royal Navy (R)	W995186J	LH	Susan	Bell	HMS Forward (Reserves)	MLT
TT05	Royal Navy	D230526V	CPO	Colin	Reynolds	RNAS Yeovilton	MLT, WMF
TT05	Royal Marines	30193084	Marine	Oliver	Wardman	CORPS COLONELS	
TT05	Royal Marines	30104065	Marine	Aaron	Cath	Cdo Recruiting Troop	Team Medic Trained – Medical Lead
TT06	Army	551904	Lt Col	Jonathan	Round	DMG(N)	SML, WMF. Doctor (Consultant Anaesthetist)
TT06	RAF	30120010	Flt Lt	Matthew	Smyth	CAM RAF Henlow	SML, ASL, RCL. Doctor
TT06	RAF	30118210	Flt Lt	Karl	Cooper	CAM RAF Henlow	Doctor
TT06	Army	30111982	Lt	Lucy	Archbold	DMG(N)	SMF. Nurse
TT06	Army	W1052790	2Lt	Jennifer	Hain	DMG(N)	SMF. Nurse
TT06	Army	30135580	Cpl	Kate	Abbot-Hull	DPHC Tidworth	SMF, MFA. Nurse
TT06	RAF	30211386	Cpl	Bishal	Gurung	DMG(N)	SMF. Nurse
TT06	RAF	30211383	Cpl	Tiffany	Hubbard	DPHC RAF Shawbury	SMF. Nurse
TT06	Army	Q1046862	Cpl	Helen	Jamieson	DMG(N)	SMF. BMS
TT06	Army	30139027	Cpl	Ben	Page	DMG(N)	MLT. Nurse
TT06	RAF	30109951	Cpl	Daniel	Parkes	DMG(N)	SMF. Nurse
TT06	RAF	30051009	SAC(T)	Rachael	Cupit	DMG(N)	SMF. ODP
TT07	Army	25535087	Capt		Aldred	2SR	Exped IC MLT
TT07	Army	561536	Maj		Gumbley	2SR	MO MLT
TT07	Army	21170824	Capt		Vishal	2SR	MLT
TT07	Army	21170740	Sgt		Prakash	2SR	Stores IC & MT Rep MLT
TT07	Army	21171238	Sgt		Mehar	2SR	Lead Instr

							SML
TT07	Army	21169346	Cpl		Pawan	2SR	Exped 2IC
TT07	Army	21170235	Sgt		Parasmani	2SR	
TT07	Army	30190504	Cpl		Ajay	2SR	MLT
TT07	Army	30194022	LCpl		Roberts601	2SR	
TT07	Army	561536	Sig		Marchington	2SR	Photographer
TT07	Army	21168971	SSgt		Bharatmani	2SR	MLT
TT07	Army	21171721	LCpl		Basanta	2SR	Instr SML
TT08	RAF	8304981D	Sqn Ldr	Peter Martin Sean	McCreedy	RAF Spadeadam	Team leader. SMF,WMF, RCS.
TT08	Army	566578	Maj	Rikul	Karadia	Northwood HQ	Deputy Team leader. JSMEL.
TT08	Army	542182	Lt Col	Andrew	Williams	Royal Gwent Hospital, Newport	Team doctor.
TT08	RAF	30007651	Flt Lt	Adam Derek	Foley	Northwood HQ	MLT.
TT08	RAF	Y8700314	Flt Lt	Suzanne	Mitchell	RAF Spadeadam	SMF. Experience UK hill walker.
TT08	Army	25002863	WO2	Antony Michael	McPhillips	127 Fd Coy REME	WML 13Feb15, ALS 20May11, RCI 23Jul12 and WCL, 12Feb16.
TT08	RAF	D8206148	Flt Sgt	Robert	McCormack	RAF Leeming	MLT.
TT08	RAF	K8407508	Cpl	Michael Alexander	Aitken	RAF Spadeadam	Experience of UK hill walking.
TT08	RAF	P8504929	Cpl	Stephen Patrick	Owen-Smith	RAF Staxton Wold	Himalayan experience (Annapurna circuit)
TT08	Army	30173849	L/Cpl	Greg Scott	Campbell	3 ACS Bn REME	Novice.
TT08	RAF	30149902	SAC	Thomas Andfrew	Chapman	RAF Spadeadam	SMF. Novice
TT08	RAF	30104032	SAC	Robert	Gallagher	90 Signals Unit	SMF.
TT08	Army	30173648	Air Tpr	William	Hodson	4 Regt Army Air Corps	Novice.
TT08	Army	30195390	Air Tpr	Sean	Holt	4 Regt Army Air Corps	Novice.

TT09	Army		Lt Col		Attwood	201 Field Hosp	SMF, WMF, SF3
TT09	Army		Capt		Gething	201 Field Hosp	JSMEEL (S)
TT09	Army		Capt		Hannaford	201 Field Hosp	JSMEEL (S)
TT09	Army		Capt		Johnson	201 Field Hosp	SF2
TT09	Army		Capt		Sharma	201 Field Hosp	SMF, WMF
TT09	Army		Lt		Crooks	201 Field Hosp	
TT09	Army		2Lt		Earl-Wright	201 Field Hosp	
TT09	Army		WO2		Fisher	201 Field Hosp	MLT, WMF
TT09	Army		Cpl		Cairns	201 Field Hosp	
TT09	Army		Cpl		Palmer	201 Field Hosp	SF3
TT09	Army		Cpl		Smith	201 Field Hosp	SF1
TT09	Army		Pte		Sheppard	201 Field Hosp	SMF, WMF
TT10	Army	25056855	WO2	Ben	Wilkins	4 AAC	AML, WML,.
TT10	Army	25026572	WO1	Jonathan	Lean	HQ AAC MIDDLE WALLOP	MLS
TT10	Army	25024699	CAPT	Alex	Rutterford	4 AAC	MLT
TT10	Army	25221381	SGT	Alex	Jewell	4 AAC	CLASS 1 MED TECH BATTLES TRAINED
TT10	Army	30172495	LCPL	Daniel	Salter	4 AAC	SMF – COURSE 06 MAR 16
TT10	Army	30120753	LCPL	Marlon	Paice	4 AAC	
TT10	Army	30195889	LCPL	Guy	Hannaford	4 AAC	SMF – COURSE 06 MAR 16
TT10	Army	30208795	ATPR	Aaron	Thompson	4 AAC	
TT10	Army	30209645	ATPR	Amie	Chippendale	4 AAC	
TT10	Army	30175397	LCPL	Nichola	Mccarthy	4 AAC	CLASS 1 MED TECH BATTLES TRAINED
TT10	Army	30157720	ATPR	Lee	Irvine	4 AAC	
TT10	Army	30197175	ATPR	Jake	Hall	4 AAC	
TT10	Army	25215688	CPL	Karlan	Adamek	4 AAC	

TT10	Army	30199742	ATPR	Lewis	Smelt	4 AAC	
TT10	Army		LT COL	Neil	Hill	4 AAC	EMBEDDED RESEARCH DOCTOR.

**ANNEX B to  
BSDMRE 2016 PXR  
DATED 22 Jul 16**

Main and HADT itinerary			
Day	Sleeping altitude	Activity (evening location)	
0	1400m	Arrive Kathmandu	
1	1400m	Kathmandu – baseline data collected	
2	848 m	Beni	
3	2679m	Move to Marpha by vehicle	
4	2679	Marpha, subjects free to do own trekking acclimatisation	
5	3720m	Trek Alu Bari Lower Camp, 3650m, o/n camp	
6	3720m	Alu Bari Lower Camp, 3650m, Acclimatisation day.	
7	4150m	Trek Yak Kharta	
8	4150m	Yak Kharta, 4600m, acclimatisation day, o/n camp	
9	4150m	Yak Kharta, 4600m, acclimatisation day, o/n camp	
10	5140m	Trek Hidden Valley 4975m (via Dhampus Pass 5250m)	
10		Hidden Valley, 4975m, acclimatisation day,	
11-24		Hidden valley basecamp for attempts on Dhampus peak <b>6035m</b> and Tukucho peak <b>6800m</b> – individual itineraries.	
25	4800m	Team reduces to 12 and move to Dhaulagiri BC	
26 - 50		Dhaulagiri BC – individual itineraries. Altitude of <b>7500m</b> achieved by 5 team members.	
51		Trek to Hidden Valley	
52		Trek to Marpha	
		Rest Marpha	
		Rest Marpha	
		Drive to Pokhara	
		Drive to Kathmandu	
		Fly to UK	

**TREKKING TEAM ITINERARY**

Day	Activity	Sleeping altitude
1	Fly from UK	
2	Arrive Kathmandu	
3	In Kathmandu - sightseeing tour	
4	Drive to Beni via Pokhara	

5	Drive Darbang and trek to Riverside	
6	Trek to Jugepani	1456m
7	Trek to Bagar	2017m
8	Trek to Doban	2430m
9	Trek to Sallagari	3107m
10	Trek to Italian BC	3619m
11	Rest day at Italian BC	3619m
12	Trek to Japanese Camp or Upper	4072m
13	Trek to Dhaulagiri Lower BC	4700m
14	Rest Day at Dhaulagiri Lower BC	4700m
15	Trek to Hidden Valley	4900m
16	Rest day at Hidden Valley	4900m
17	Trek to Yak Kharka	4600m
18	Trek to Marpha	2670m
19	Drive to Pokhara via Beni	
20	Drive to Kathmandu	
21	Free day in Kathmandu	
22	Fly to UK	

TT01 depart UK 09  
Apr 16, TT10  
depart Nepal 18  
May 16

## COMMS PLAN FOR THE BRITISH SERVICES DHAULAGIRI MEDICAL RESEARCH EXPEDITION 2016

### Introduction.

1. From a combination of consultation with Inmarsat (the primary J6 expedition sponsor), previous Himalayan high altitude mountaineering J6 coordination experience (Ex PARBAT TIGER 2014), consultation with Paul Hart (Makalu 2010), and consultation with expedition members during the alpine MRX, the below comms plan is proposed.

### Priorities.

2. Consideration has been given to balance the BRITISH SERVICES DHAULAGIRI MEDICAL RESEARCH EXPEDITION 2016 (BSDMRE 16) alpine mountaineering aim of 'fast and light', with the essential requirement to provide a robust and resilient comms plan for all elements of the expedition.

a. The facilitation of effective C2 between all teams for the safe conduct of all elements of the expedition is identified as the first priority, this includes remote parties such as the rescue or evacuation agencies, Defence Attaché, and embassy etc.

b. The provision of an emergency J1 communication link for expedition members and their families is the second priority.

c. Being mindful that without the support of the tri-services and expedition sponsors, this expedition and future expeditions would not be feasible, and therefore the coordination of media is the third and final priority.

### Recommendations.

3. Early consultation with the Nepalese Government via the Defence Attaché to facilitate the granting of the required permits required for the temporary importation of the equipment is imperative. This requirement currently lies with Far Frontiers who have been provided with equipment data sheets and serial numbers for the bearer systems that will be provided from Inmarsat. This is IOT facilitate the procurement of the correct permits.

4. Inmarsat is fundamental for the provision of the SatCom equipment. Inmarsat have offered support including but not limited to; a limited data provision (reasonable usage clause), the loan of equipment<sup>6</sup>, and technical training and support. Continual engagement with Inmarsat should be considered a priority of the J6 team.

5. A robust power plan needs to be developed that will maintain a balance between capability and logistical burden. A combination of solar charging systems and generators will be used.

### COAs.

6. There are 6 elements of the expedition that require a J6 link of varying forms. In priority order they are; the basecamp, the Main Team, the High Altitude Development Team (HADT), the medical research stations (3no.), the trekking teams, and any remote parties such as the embassy, the Defence Attaché, expedition sponsors, media, expedition members home units or families etc. The varying elements are prioritised in this manner due to their decreasing exposure to risk whilst deployed on the expedition.

7. **Basecamp.** As the primary command and coordination node for the expedition, basecamp will require capability to communicate with all parties. VoIP, files of varying size and type, and also live video streaming for media relations are required at basecamp.

a. **Primary.** A Hughes 9211-HDR BGAN bearer will be used as a means to communicate with all parties via voice or live video telephony.

b. **Alternate.** The use of an IStat Hub will allow email, voice or text communications between fixed camps.

c. **Contingency.** IsatPhone2 satellite phones will be used to communicate with

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<sup>6</sup> See Annex A – Inmarsat loan equipment provision

all parties. Using IsatPhone2s would maintain voice communications and a limited ability to send and receive small data files. The ability to robustly transmit large amounts of data, and live video would be lost.

d. **Emergency.** Alternative Iridium satellite phones are being provided by the Nepalese embassy that utilise a different satellite network. These phones will have the same functionality as the IsatPhone2 handsets but still provide an alternative means if the Inmarsat phones become US.

8. **Main Team and HADT.** Will primarily require communication capability to the basecamp. In addition, they may require the ability to communicate between the different Main Teams and HADTs.

a. **Primary.** UHF transceivers will enable simple and robust communication between the Main Teams, HADTs, and basecamp.

b. **Alternate.** SatPhones will be used as an alternate to UHF to communicate to Main Teams, HADTs, and to basecamp. This is due to their reliability and small size.

c. **Contingency.** Sending a minimum of 2 climbers at a time down to the next team, or to basecamp is the contingency for communications in the event of lost comms.

d. **Emergency.** In the event of an emergency, and all comms becoming unworkable, and the Main Team and/or HADT becoming fixed in location and unable to retreat, the emergency comms plan is that all climbers carry a cyalume, and whistle. The cyalume is elevated as far as possible, and the team members takes it in turn to alert the parties below using the international distress signal. The teams should prepare to send runners as soon as this becomes practical.

9. **Medical stations.** Will require communications to the basecamp, to the trekking teams, and potentially to remote parties.

a. **Primary.** BGAN will be used for primary communication between the medical stations and basecamp, and also to the remote parties. The reliability and clarity of BGAN VoIP enables precise and accurate communication, with the additional advantage that both videotelephony, and data can be utilised (such as emails, metrological reports, and image files).

b. **Alternate.** SatPhones will be used as an alternate to BGAN to communicate with all parties due to their reliability and small size.

c. **Contingency.** UHF will be used as the contingency method to communicate with all parties, with the exception of the remote parties who would be uncontactable via this method in the event that all other means were lost.

d. **Emergency.** GSM900/1800 is the same mobile network frequency system as used in the UK. Previous Nepalese expedition experience has shown that there is increasing mobile phone coverage across the mountainous areas of Nepal. Therefore, GSM900/1800 will be used as an emergency method to contact the basecamp and remote parties.

10. **Trekking teams.** Will require to communicate to the medical stations and potentially to basecamp.

a. **Primary.** SatPhones will be used to communicate to both the medical stations and the basecamp. This is due to their reliability and small size.

b. **Alternate.** UHF transceivers will enable simple and robust communication between the trekking team and the medical stations. Messages sent via alternative call signs may also reach basecamp.

c. **Contingency.** GSM900/1800 is the same mobile network frequency system as used in the UK. Previous Nepalese expedition experience has shown that there is increasing mobile phone coverage across the mountainous areas of Nepal. Therefore, GSM900/1800 will be used as an emergency method to contact the basecamp and remote parties.

d. **Emergency.** In the event of an emergency, and all comms becoming unworkable, and the trekking teams becoming fixed in location unable to make their way to either the next, or the previous medical station, the emergency comms plan is that all trekkers carry a cyalume, and whistle. The cyalume is elevated as far as possible, and the

team takes it in turn to alert neighbouring parties of the emergency using the international distress signal. All trekking teams will have sufficient safety stores to go firm and await rescue.

#### **Equipment.**

11. The below equipment scales will be utilised to achieve the comms plan. The majority of the equipment has been supplied by Inmarsat,<sup>7</sup> however several items would need to be procured from elsewhere.

- a. 1no. Hughes 9211-HDR held in reserve at Dhaulagiri Basecamp
- b. 2no. Cobham Explorer 710 bearers for use at the medical stations IVO Italian BC, and Dhaulagiri Lower Basecamp.
- c. 1no. Hughes 9211-HDR for use at the medical station IVO Hidden Valley Camp.
- d. 1no. IStat Hub for use t Dhaulagiri Basecamp
- e. 6no. ISatPhone2 handsets. 2no. for the Main Team and HADT, 4no. for trekking teams.
- f. 2no. Iridium phones from the embassy. To be distributed to the trekking teams.
- g. 4no. Sat phones of either type. To be distributed to the trekking teams.

THESE ARE YET TO BE SOURCED.

- e. 6no. UHF transceivers for basecamp.

12. A suitable variety of solar charging equipment has been tested ranging from highly portable and lightweight PowerTraveller products, to less mobile larger systems. The results of the testing process have enabled a suitable selection to be chosen for utilisation.

#### **Communication Schedule.**

13. The below communications schedule will be adhered to by all teams whilst IVO Dhaulagiri. During these times UHF and SatPhones are to be switched on even after transmitting own uprep.

- a. 0700 to 0800 - SatPhones and UHF to be switch on in readiness to receive met brief and downrep from basecamp.
- b. 1800 to 1840 - Teams send uprep to basecamp, including locstat, primary is via email, secondary via voice/VoIP.
- c. 1840 to 1900 – All teams maintain listening watch, standing by to relay messages as required.
- d. 2130 to 2200 - 30 minute listening watch by all teams on SatPhones and UHF. All teams standing by to receive detail or relay messages.
- d. Basecamp will maintain a listening watch by UHF and SatPhone at all times.

#### **Lost Comms Procedure.**

14. The below procedure must be adhered to by all teams in the event of lost comms.
- a. If no uprep sent by team or received by basecamp at 1900 or as a last resort during the 2130 to 2200 listening watch, then phone FFE Nepal Office. Adjacent teams to standby and maintain listening watch.
  - b. Maintain a contact schedule with the team in front or behind.
  - c. 2359 is the deadline for contact with basecamp or adjacent teams otherwise adjacent teams will be tasked to send runners at the earliest time deemed safe to do so.

#### **Incident Procedure.**

15. In the event of a **major incident**, defined as the loss of life or a participant suffering significant injuries, the below procedure will be complied with.

- a. Start incident log – to be recorded in hardcopy in the first instance, by the station Duty Officer where the incident is first highlighted. The basecamp Duty Officer is to start a significant incident log as soon as basecamp is informed. Simultaneously the expedition commander is to be made aware of the occurrence.
- b. Op MINIMISE is to be activated, all stations to withdraw internet and SatPhone access for expedition members personal use.

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<sup>7</sup> See Annex A – Inmarsat loan equipment provision

c. Basecamp Duty Officer is to coordinate informing the British Embassy Kathmandu, FFE, SO2 AT RN, CO MDHUN, JCCC as per telephone numbers in Administrative Order and JSATFA.

16. In the event of a **minor incident**, the below procedure will be complied with.

a. Start incident log – to be recorded in hardcopy in the first instance, by the station Duty Officer where the incident is first highlighted.

b. The trek or team coordinator should be informed ASAP.

c. The trek or team coordinator should record the incident and decide whether to alert the Duty Officer at basecamp.

d. It is the trek or team coordinators task to inform the relevant unit duty officer.

**PRESS RELEASE – 16 March 2016**

**BRITISH SERVICES EXPEDITION TO CONDUCT PIONEERING MEDICAL RESEARCH  
AS THEY SUMMIT WORLD'S 7<sup>TH</sup> HIGHEST PEAK**

A team of British military personnel will travel to Nepal later this month aiming to make an alpine-style ascent of the north east ridge of Dhaulagiri, which at 8167m is the seventh highest point on earth.

Alongside this feat of mountaineering, the team will conduct important, pioneering medical research into the effects of altitude on the human body – the first time a military study has done so above 6,000m and using implanted technology. The team will climb at extreme altitudes without oxygen, setting off from the UK on 27 March 2016 and following 6 weeks of acclimatisation, aiming to make the summit around 20 May.

The joint service expedition, officially named the 'British Services Dhaulagiri Medical Research Expedition' or 'BSDMRE 2016', has the support of influential patrons: His Royal Highness the Duke of York, Mark Lancaster MP, the Second Sea Lord, Air Member for Personnel, Commandant General Royal Marines and the Surgeon General acting as Patron for the scientific programme.

The main team making the gruelling 8,167m ascent will be involved in two studies looking at the effect of an injection of iron on the body's response to low oxygen levels and measuring heart rate and rhythm during the climb. In addition to its relevance to sport and exercise science, it is hoped that this data may provide insight into how the heart behaves in the face of disease or illness. The study involves the use of an innovative Medtronic Reveal device – a two-inch monitor which is implanted under the skin on the chest by a minor surgical procedure that stores and uploads data of each heart beat during the expedition by satellite phone. This technique will allow the team to collect unique data from the heart during exercise at extreme altitude at low oxygen tensions, never previously achieved by a military study above 6,000m.

Speaking about the research, expedition leader Surgeon Commander Adrian Mellor said:  
"Until recently it has only been possible to collect heart rate data at rest due to the size and

difficulty of obtaining a clear electrical recording from the heart extreme altitudes. Now that we are able to do this, for the first time we will have accurate and sustained readings that will help us understand what happens to the heart rhythm during times of very low oxygen supply. This and other studies in conjunction with Leeds Beckett and Oxford Universities will help us better prepare soldiers for deployment at high altitude and understand the body's response to critical illness.

The BSDMRE 2016 climbing and research plan is ambitious; the nature of Himalayan high altitude mountaineering in an often hostile environment with ever-present danger means that climbers will be mentally and physically tested. Dhaulagiri means dazzling, white, beautiful mountain in Nepali. It was first climbed in 1960 via the North East ridge by a Swiss, Austrian and Nepali team – the same route that the main team of the Joint Service Expedition will be attempting.

The BSDMRE expedition will signify a new approach within military mountaineering. Until now military attempts on such high mountains have been attempted “siege style” – repeatedly carrying loads and establishing camps ever-higher on the mountain whilst acclimatising to the increasing altitudes. Informed by recent research, BSDMRE will instead climb in a lightweight “alpine” style, acclimatising on Damphus and then Tukucho peaks (6000m and 7000m respectively) before ascending again to Dhaulagiri base camp. Overnight stops on the east ridge at around 6500m and again at 7400m, before the route breaks out onto the top of the north face to traverse underneath the summit through a small gully, mean that the climb up should take 3 days and around 2 days in descent.

Mountaineers of all abilities and ranks will take part in the expedition, promoting and developing the sport within the military and beyond. Trekking and development teams will explore trekking circuits and the smaller Tukucho Peak, whilst the main team will attempt the NE ridge of Dhaulagiri without oxygen in Alpine style. All trekking participants will be able to volunteer for the medical research program, providing vital data for the study.

-ENDS-

#### **Notes to Editors:**

The expedition website [www.dhaulagiri2016.com](http://www.dhaulagiri2016.com) has information on the climbing plan, medical research, the teams and sponsors.

Relevant videos taken during the expedition will be uploaded to the YouTube link on the website and any photographs will be uploaded to a Google drop box with limited access.

Follow the expedition's progress via Facebook [www.facebook.com/BSDMRE2016/](http://www.facebook.com/BSDMRE2016/) and Twitter <https://twitter.com/dhaulagiri2016>

Internal MOD media streams will be managed by the Navy Media team throughout the expedition.

**For more information please contact:**

Maj Rich Mackie RM  
BSDMRE Media

**ANNEX E to  
BSDMRE 2016 PXR  
DATED 22 Jul 16**

**BREAK DOWN OF INCOME AND EXPENDITURE MAIN TEAM AND HADT (24 PAX)**

<b>Public income</b>	<b>Cost £</b>	<b>Expenditure</b>	<b>Cost £</b>
Duty travel (flights)	12900	Flights to/fm Nepal	16000
CILOR	4700	Climbing permits	22334
RAF Unit AT grants	4000	Equipment & plaques	1500
RN AT funds	18000	Training	300
Army ATG A grant	20000	Insurance	3650
RAF 22 Trg Gp	5000	Freight costs	3200
		Visas	1700
<b>Total public income</b>	<b>62200</b>	Radio permits	2711
		Launch event	2840
<b>Non public income</b>		Website	2600
Pers contributions	42000	Porters tips/summit bonuses	4300
Army Central Fund	4500	Food and fuel above BC	3268
RAF Central Fund (sports lottery)	3000	Rubbish deposit	5011
Army Sports Lottery	4500	FF Agent fees	205500
RN Sports Lottery	5000	Photography	425
RAF CT	3000	Launch loss	1070
Ulysees	5000	Hotel A/C Advance Party	595.0
sS Clubs	10000	Chocolate bars	211
DMS Expeditions	3261	Med Oxygen	643
Alpine Dragon	1500	In-country expenses & misc	4211
BSAE 2012	2500	Visas	1700
RNRMC	139500	Radio permits	2711
<b>Total non public income</b>	<b>223761</b>		
<b>Total sponsorship BBraun</b>	<b>6000</b>	Future expenditure set aside for any loan pool payments required, post expedition event at RGS, refund of expenses to expedition members	
		Proposed grant to RAF 2020 exped c £2500	
<b>Total income</b>	<b>291961</b>	<b>Total expenditure</b>	<b>282061</b>

## **BRITISH SERVICES DHAULAGIRI MEDICAL RESEARCH EXPEDITION 2016**

### **MEDICAL PXR**

#### **Pre-deployment**

1. All deploying personnel were required to fulfil the medical criteria outlined in the BSDMRE 2016 Admin Instruction including a JMES category of MFD and in-date dental and vaccinations.
2. A pre-deployment medical questionnaire found at Appendix 1 to Annex D of the BSDMRE 2016 Admin Instruction was completed by all personnel. This enabled the medical lead of the climbing team and each of the trekking teams to scrutinise any pre-existing medical conditions that may negate deployment on the expedition and assess for risk of development of high altitude illness (HAI). This was particularly useful in the absence of regular access to DMICP.
3. One individual was identified as unfit to deploy due to a pre-existing medical condition. This was escalated to senior medical consultants for opinion before a decision was made.

#### **Medical Support**

4. The expedition was staffed by a number of professionally medically qualified personnel.
5. The climbing team comprised the Expedition Medical Officer (GDMO) and the Expedition Leader (Consultant Anaesthetist). Both had previous experience of providing medical care in remote and austere environments including high altitude.
6. The research team comprising of six included four military MOs (1 x GDMO, 1 x CT1 Anaesthesia and 2 x Medical SpRs), one medical student and a military nurse.
7. Each of the eight trekking teams had its' own MO apart from two who both had an in-date Royal Navy Level 2 First Aider.

#### **Medical Kit and Medications**

8. All deploying personnel were advised to carry a small personal first aid kit comprising simple analgesia, anti-diarrhoeal medication, blister kit and basic wound care kit.
9. All medical leads were supplied with a Lifesystems Mountain Leader Pro First Aid Kit. This is a comprehensive medical kit containing the majority of items required to treat common medical problems experienced on an expedition. In addition, they were also recommended to carry the following medications to treat high altitude emergencies, traveller's diarrhoea and moderate to severe pain:
  - a. Azithromycin 500mg 30 tablets
  - b. Acetazolamide 250mg 112 tablets

- c. Dexamethasone 2mg 28 tablets
- d. Dexamethasone 3.8mg 5 vials (Medical Officers only)
- e. Nifedipine (Modified Release) (Adalat LA 30) 30mg 14 tablets
- f. Co-codamol 30/500 30 tablets

10. These medications were supplied by the unit medical centres of the individual. The Expedition Medical Officer wrote to the unit MOs requesting supply of these medications for distribution to their trekking team if required. For non-professionally qualified medical personnel who are unable to prescribe a Patient Safety Directive (PSD) was written for each individual drug stipulating indications and contra-indications for administration. This process was approved by SO1 Pharm at SGs department.

11. The expedition stocked three research camps and Dhaulagiri Base Camp (DBC) with a comprehensive medical kit including medications to treat common primary healthcare conditions and emergencies. The contents of these can be found in Appendix 7 to Annex D of the BSDMRE 2016 Admin Order. Each of the medical kits were mustered and packed in KTM into a medium-sized duffel bag.

12. Commonly issued medications included paracetamol, ibuprofen, co-codamol, loperamide, co-amoxiclav, topical acyclovir and ondansetron. Mild AMS was predominantly treated conservatively, whilst moderate and severe AMS was treated with acetazolamide and/or dexamethasone.

13. A large quantity of medical kit and medications were not used. These were donated to the doctor at the local medical clinic in Jomson at the end of the expedition.

14. Each of the four camps had two climbing oxygen cylinders (and one regulator and mask) provided by Summit Oxygen. This is a demand oxygen regulator system and was chosen to minimize oxygen wastage in the event of use (as would occur with a continuous flow device). These proved adequate when used on a number of occasions.

15. DBC and HVC were also stocked with a Gamow bag as these camps had the highest risk of individuals requiring their use.

16. There were no issues transiting from the UK to Nepal (via UAE) and back with controlled drugs in hand luggage.

### **Medical Cases**

17. 122 separate medical diagnoses were recorded across the whole expedition.

18. HAI was the most common presentation category accounting for 52% of all diagnoses, followed by gastrointestinal (GI) illness at 25%, general systemic illnesses at 5%, musculoskeletal problems (MSK) at 5%, respiratory illness at 4% and dermatological problems at 4%.

19. The majority of HAI presentations were high altitude headache (HAH) (58%) with AMS accounting for 40% of presentations. Most cases of AMS were mild and self-limiting. There was one case of high altitude cerebral oedema (HACE).

20. There was minimal documented trauma with only a foot laceration and an ankle sprain.

21. There were three separate incidents requiring helicopter MEDEVAC of a total of five patients. This was in-line with our medical estimate.
- a. Dehydration secondary to severe diarrhoea – despite treatment and sufficient time this patient became too weak to walk out necessitating MEDEVAC.
  - b. High Altitude Cerebral Oedema – sudden onset HACE at approximately 5000m en-route to the Hidden Valley Camp (HVC) secondary to pre-existing medical condition (not undiagnosed at time). Patient became ataxia with reduced consciousness requiring re-pressurisation (Gamow bag), oxygen therapy, emergency medications and MEDEVAC.
  - c. AMS x 2 – two patients in the trekking team of the HACE incident concurrently developed severe AMS and were MEDEVAC'd in the same helicopter.
  - d. Severe AMS – one patient developed worsening AMS on arrival at the HVC and became too unwell to walk out.
22. There were 16 cases of patients requiring early descent on foot (11 trekkers, five climbers). Three trekkers were unable to complete the circuit and descended in the opposite direction, whilst the other eight descended early from the HVC. Due to the logistical constraints of the trek, none of the trekkers were able to re-ascend, however four members of the climbing team were able to re-ascend following a short recovery. One of the trekkers was able to walk out of the HVC using supplementary oxygen.
23. 12 cases of early descent were due to AMS. Of the other four cases; one related to a lacerated foot requiring surgical intervention, one was for non-medical reasons and two were due to gastroenteritis.

### **Lessons Identified**

24. Due to the expedition not belonging to an individual unit, procurement of medical kit and medications was difficult. The kit was eventually ordered through the QM of the Expedition Leader's unit DMG(N), however most items took significant time to arrive, some arrived in bulk, whilst others were unavailable.
25. Some medications that were not available were sourced in KTM. These are produced in India and are of good quality.
26. The Dhaulagiri trekking circuit is a very remote region. The HVC at 5100m provides additional issues being located in a bowl with a 5300m col either side. As such it requires ascent before descent can be initiated on foot. This was known prior to deployment and is articulated in the risk assessment. It is therefore potentially very medically challenging and our mitigation included four well-stocked medical facilities at each research camp and DBC, manned by appropriately qualified and experienced medical personnel. Due to the implications of the terrain at HVC, the assessment to allow individuals to ascend from DBC to HVC was carefully considered by a doctor prior to each team departing.
27. Helicopter MEDEVAC activated through Far Frontiers Expeditions (who concurrently liaised directly with the insurance company and helicopter companies in Nepal) proved effective. Immediate payment to the helicopter company was only possible through the insurance policy.

## Overall Recommendations

28. The High Risk and Remote Committee should always include a suitably experienced professionally qualified medical practitioner who can scrutinise a medical plan and risk assessment to ensure appropriate mitigation of all medical risks. Different high altitude treks and climbing expeditions will have different risks therefore altering the level of medical support required.

29. An SO1 in Expedition and High Altitude Medicine should be appointed in order to advise the Medical Director on governance issues surrounding this field. Key issues include:

- a. The lack of a robust reach-back mechanism for expedition leaders and medical leads to contact for deployed medical advice and pre-deployment issues. One possibility is the establishment of a 24/7 on-call rota (akin to the Defence Diving Medical Officer system at INM) of qualified and experienced MOs in this field.
- b. The establishment of a high altitude medicine teaching program. This will equip expedition medical leads with the basic knowledge and skills required to operate safely in this environment.
- c. The establishment of a high altitude module of key medical kit and drugs used in this environment. This would be scaled for a small number of individuals (e.g. six) and medical leads could then order without wastage. Each drug will have a PSD attached enabling non-prescribers to distribute. Knowledge on these drugs will be tested on the high altitude medicine teaching program discussed above.

30. Carriage of a portable hyperbaric chamber (Gamow bag) should be considered mandatory for similar trekking and mountaineering expeditions. Procurement of one through the QM chain is not possible and the military should consider the purchase of some for this purpose.

J Bakker-Dyos  
Surg Lt RN  
Expedition Medical Officer