

Alaska 2012 Expedition Proposal

Submitted on behalf of:

Sara Arbós i Torrent
Boris Korzh
Samuel Thompson
Arnaud Sors
and
Jonathan Phillips (Reserve)

Imperial College of Science, Technology & Medicine

January 26, 2012



Contents

1	Introduction	1
1.1	Aims and Objectives	1
1.2	The Area: <i>The Wrangell-St.Elias National Park, Alaska</i>	1
1.2.1	Historical and Cultural background	1
1.2.2	Previous expedition to the Jeffries-Baldwin-Fraser Glaciers.	2
1.3	Information	3
1.3.1	General Information	3
1.3.2	Useful Contacts	3
1.4	Itinerary and Route	4
1.4.1	Climbing Objectives	5
1.5	Research and Photography	5
1.5.1	Kite Aerial Photography, KAP: <i>Definition</i>	5
1.5.2	Operations and training	6
1.5.3	Equipment	6
2	Expedition Team	7
2.1	Sara Arbós i Torrent	7
2.2	Boris Korzh	8
2.3	Samuel Thompson	9
2.4	Arnaud Sors	10
2.5	Jonathan Phillips	11
3	Logistics	13
3.1	Maps and Navigation	13
3.2	Getting Equipment to Alaska	13
3.3	Terrain	13
3.4	Weather	14
3.5	Wildlife	14
3.5.1	Bears	14
3.5.2	Moose	15
3.6	Pictures and Journal	15
3.7	VISAS and permits	15
3.8	Reducing our Impact	15
4	Finances	17
4.1	Currency	17
4.2	Travel Expenditure	17
4.3	Equipment Expenditure	17
4.4	Income	17
5	Equipment	18
5.1	Clothing	18

5.2	Skis	18
5.3	Boots	18
5.4	Pulk System	19
5.5	Tents and Sleeping	19
5.6	Climbing Equipment	19
5.7	Avalanche Rescue Equipment	19
5.8	Cooking Equipment	19
5.9	Communications	19
6	Consumables	21
6.1	Food	21
6.2	Water and Drinks	21
6.3	Fuel and Gas	21
7	Medical and First Aid	22
7.1	Expedition Medicine	22
7.1.1	Antibiotics	22
7.1.2	Creams and Ointments	22
7.1.3	High Altitude Drugs	22
7.1.4	Dressings and Instruments	22
7.1.5	Painkillers	23
7.1.6	Other Medication	23
7.1.7	Personal First Aid Kit	23
7.1.8	Travel Health	23
7.1.9	Important Medical Contacts	24
8	Training	25
8.1	Proposed Short/Weekend Trips	25
8.2	Proposed Long Training Trips	25
8.3	First Aid Training	25
9	Risk Assessment	26
9.1	Hazards Associated with Altitude (Medium to High)	26
9.2	General Mountaineering and Ski Touring Considerations	27
9.2.1	Equipment	28
9.2.2	Outdoor Related Risks	29
9.2.3	Steep Ground	30
9.2.4	Skiing Risks	31
9.2.5	Wildlife Risks	31
9.2.6	General Travel Risks	31
10	Budget	32
11	Bibliography	34
11.1	Institutions and Resources	34
11.2	Web Pages	34

11.2.1 Safety	34
11.2.2 Climbing area and Objectives	34
11.2.3 Equipment	34
11.2.4 Bears	34
11.2.5 Maps	34
11.2.6 Kite Aerial Photography	35
11.3 Books	35
11.4 Previous Expeditions to Alaska	35
11.5 Previous IC expeditions	35
11.6 Research Contacts	35
A Useful Contacts	37
B Safety Plan	38
B.1 Safety Plan	38
B.1.1 Participants	38
B.1.2 Emergency Services	38
B.1.3 Medical and Travel Insurance	38
B.1.4 Upon Arrival	38
B.1.5 Telephone Numbers	38
B.2 Incident response	39
B.3 Evacuation Procedure	41
C Avalanche Safety	44
C.0.1 Prediction	44
C.0.2 Avoidance	44
C.0.3 Survival Tactics	45
C.0.4 Rescue	45
C.0.5 Equipment Recommended	45
C.0.6 Expedition Training	46
D Lake Louise Self Assessment Scorecard	47
E Kite Aerial Photography	48
E.1 Parts and Manufacturing	48
F Equipment List	49
F.1 Clothing	49
F.2 Tents and sleeping	49
F.3 Mountaineering	49
F.4 Communications and Safety	49
F.5 Other	49

Chapter 1

Introduction

1.1 Aims and Objectives

The overall aim of the expedition is to live for month, unsupported, on the ice and rock of the rarely explored territories of the Wrangell Mountains in Alaska.

We have chosen the Baldwin and Fraser glaciers area, between the Jefferies Glacier and the Logan Glacier. However, ongoing investigation and inquiries are still taking place and the final destination might be altered slightly although it will still be within the Wrangell area.

None of the members have been to Alaska before and this will be an opportunity for all of us to learn how to adapt to the conditions there.

Our general objectives are:

- To return home safely having enjoyed the challenges and unique environment of Alaska.
- To explore rarely visited territories of the Wrangell-St Elias National Park and Preserve.
- To attain first ascents of previously unclimbed peaks using both ski mountaineering and alpine climbing techniques.
- To identify other potential objectives in the area for future expeditions.
- To obtain relevant aerial photographic material both of the objectives and the glaciers. This will contribute to the report production as well as serve as an aid tool for the planning of future expeditions to that area.
- To inspire other members of Imperial College, as well as the wider mountaineering community, to explore Alaska.
- To extend the ski mountaineering, alpine and expedition experience of all members.

Moreover, we also aim to produce a report including snapshots of the geography, wildlife and history of the Wrangell - St. Elias Natural Park and to provide useful photographic material for future expeditions to these unexplored territories.

We believe that no Imperial College Expedition has ever visited the Wrangell-St Elias Range previously, hence we hope to raise awareness of the potential of this incredible area.

1.2 The Area: *The Wrangell-St.Elias National Park, Alaska*

Wrangell St. Elias National Park combines towering peaks, enormous ice fields, raging glacial rivers and ice scoured valleys. The Park contains the second highest peak in the US and the largest collection of ice fields in Alaska. The park is named after the Wrangell and St. Elias Mountain range and it is part of the largest federally protected area in the world as well as a UNESCO World Heritage Site.

1.2.1 Historical and Cultural background

The Wrangell Mountains were named after Baron Ferdinand Petrovich von Wrangel (1796-1870), who was a Russian Naval officer, arctic explorer, and government administrator. Lt. Henry T. Allen was the one to actually name many of the Wrangell Mountains in his exploration of the Copper River Basin in 1885. He also named some of the peaks within the range, such as Sanford, Drum, and Blackburn, as well as other natural features in the area.

The St. Elias Mountains were named by explorer Vitus Bering (1681-1741). Bering was a Danish explorer in Russian employ who was selected in 1725 by Peter I to explore far NE Siberia. In 1728 Bering oversaw the exploration and mapping of the far reaches of Siberia and headed an expedition across the sea (which later was to bear his name) to Alaska. In 1741 he commanded the St. Peter while Aleksey Ilich Chirikov (d. 1748) commanded the St. Paul. They set out, rounded Kamchatka and then sailed west, where the vessels were separated. Bering sighted massive coastal mountains on July 16. The lofty summit of Mount St. Elias was the first piece of Alaska mainland to catch Vitus Bering's eye. That day was the feast day of the Saint Elias. The area where they made landfall was named for Elias. Eventually the mountain too came to be called Mount St. Elias.

Several expeditions have been lead since then which have explored further glaciers and climbed unnamed peaks. However, there are still many areas that have been rarely explored due to their remoteness and isolation as well as their harsh climate conditions. We intend to explore some of these areas.

Thus far we have encountered 3 expeditions that have been around the area we intend to visit. Nonetheless, there are still small glaciers to be visited and some unnamed peaks to be climbed.

1.2.2 Previous expedition to the Jeffries-Baldwin-Fraser Glaciers.

One of the most recent expeditions was very similar to the one we are planning. A crew of four American climbers flew into the glacier and set a base camp at 8000ft in order to climb several peaks in the area including a first ascent of peak 10460ft, 'Hudson peak'. Their programme consisted of reasonably difficult alpine climbing and ski mountaineering. They started their glacier stay on the 14th of June, a little bit later in the year than what we have decided to. However, similar snow and ice conditions should be expected. To this extend their feedback is important to us.

A second team also came to the area and managed to attain the first ascent of a 11900ft unclimbed peak now named Mount Hope. They set their basecamp at 8500ft on the Fraser glacier. The expedition took place in June 1998 and the push to the summit took place on the 30th of that month. Their ascent mainly consisted of snow and ice climbing.



(a) Expedition to the Jefferies Glacier



(b) Expedition to Mt. Hope. Route to Mt. Hope's first ascent.



(c) Expedition to Baldwin Glacier.



(d) Expedition to Baldwin Glacier.

Figure 1.1: Past expeditions to the South Eastern Area of Wrangell National Park.

1.3 Information

1.3.1 General Information

All the information used to compile the present report has been gathered via the Alpine Club, The American Alpine Club, the Royal Geographical Society, the Wrangell-St. Elias National Park official web page and several other internet resources. See bibliography 11.

1.3.2 Useful Contacts

Please see appendix A.

1.4 Itinerary and Route

The expedition dates have been chosen such that we get reasonably stable weather conditions, long days and good snow quality for ski touring and ski mountaineering practice while meeting individual expedition members personal circumstances. We will depart for Alaska in early June 2012 and return in early July to avoid snow degradation due to the temperature increase during the summer.

- 4th June → Flight from Heathrow to Anchorage via Minneapolis.
- 5th – 7th June → Anchorage. Buy missing supplies.
- 7th June → Charter Plane Anchorage-Chitina-Baldwin Glacier. Begin exploration.
- 8th June – 8th July → Ski touring exploration. Climb objectives. Live unsupported between Fraiser glacier and Baldwin glacier.
- 8th July → Pick-up charter flight from Baldwin Glacier-Chitina-Anchorage.
- 9th – 11th July → Rest days in Anchorage.
- 12th July → Flight from Anchorage to London Heathrow via Minneapolis
- 13th July → Arrive at London Heathrow



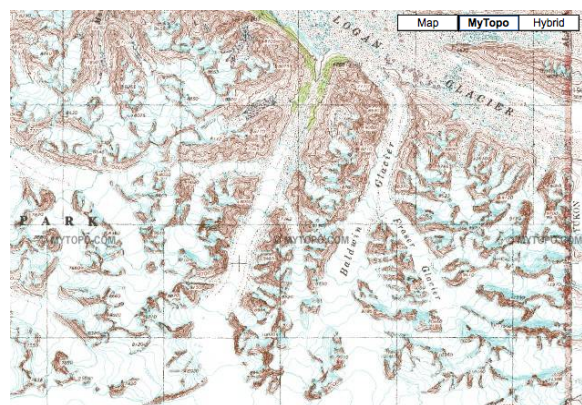
(a) Alaska Location in the World. Inside red circle.



(b) General Map of Alaska. The Red circle indicates the Natural Park in which our objectives lie.



(c) Itinerary in Alaska. Route To the Glacier Objective. Red is charter plane travel



(d) Close up of the chosen area, The Baldwin Glacier and the Fraser Glacier

Figure 1.2: Location of the area visited in respect of the World.

1.4.1 Climbing Objectives

Using past expedition reports and a database of all peaks in Alaska above 10,000ft, found on SummitPost, a detailed map of objectives has been created (Figure 1.3). Most of the peaks in the area are still un-named and presumably un-climbed. The aim upon arrival in the area will be to establish a base camp in an area which will allow us to make attempts on most of the peaks in a single day. This will largely depend upon our final chartered flight drop off location, which will be decided with the pilot. A previous expedition has been dropped off directly on the Baldwin Glacier, hence we hope to do the same on the Fraser Glacier. If we do need to transport our gear, then we will use a simple pulk system using dry bags (see section 5). Initially we will climb together as two roped teams, attempting one of the peaks with low prominence and technical difficulty, in order to get used to the terrain and acclimatise. Later on, we will break up into two teams, focussing on different objectives, in order to maximise the efficiency of the climbing and to increase the total number of peaks that we are able to climb as the overall expedition. Objectives which are further away from base camp, will be attempted in two days either establishing an advanced camp below the route, or taking a bivouac on the route. Travel to and from the routes should be very efficient since we will be using skis. Ski descents will also be considered if suitable terrain presents itself.

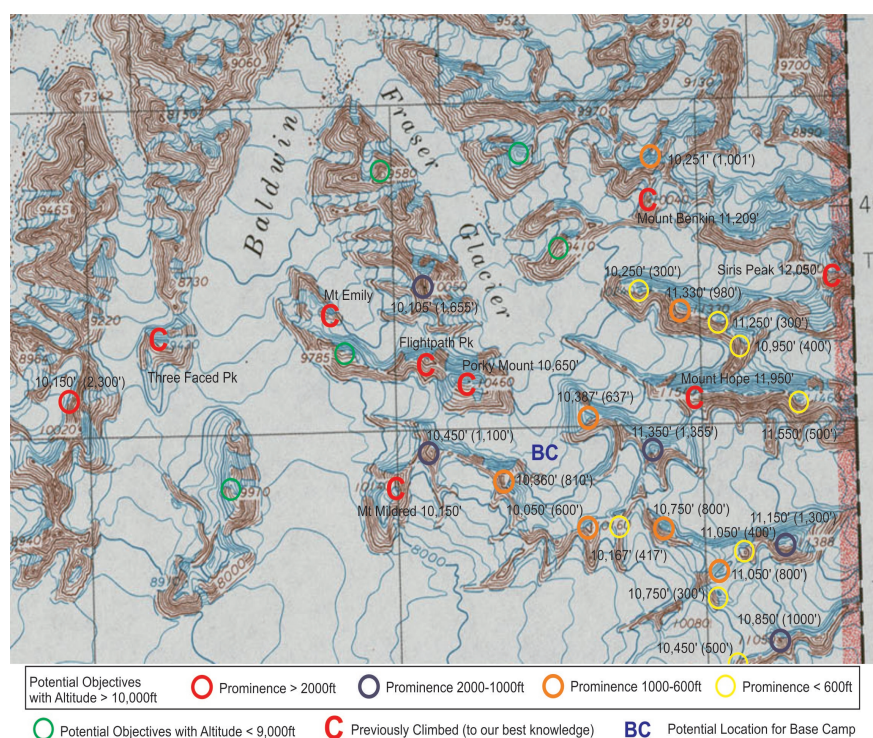


Figure 1.3: Map of the possible objectives at the destination area.

1.5 Research and Photography

1.5.1 Kite Aerial Photography, KAP: Definition

Kite Aerial Photography, *KAP*, is an emergent type of photography which can be used for local mapping, to obtain wide angle pictures, up to 170° and to capture High Definition images of remote places.

A photographic camera is lifted using a kite, see figure 1.4(a), and is triggered either remotely or automatically to take aerial photographs. The camera can be attached directly to the kite but it is usually secured to an adjustable rig suspended from the kite line at a distance from the kite. This distance reduces excessive

movement being transmitted from the kite to the camera and allows the kite to be flown into higher, more stable air before the camera is attached. If possible, the camera is set to a high shutter speed to reduce motion blur. In order to take photographs that are oriented correctly with the horizon, a suspension method is used to allow the rig to automatically level itself under the kite line. We will be using the *picavet* approach. See appendix E for further details.



(a) Kite Camera ensemble



(b) One example of a picture taken using KAP technique. Courtesy of Rob Huntley, Flickr-iver.

Figure 1.4: Examples of KAP technique

1.5.2 Operations and training

Free training courses on the operations and techniques will be given to us in Hyde Park by Spike Reid, who has designed a new *picavet* approach to the KAP technique.

In general terms the procedure is as follows, the kite is flown up to a distance of about 10m until it reaches some stability. Then the *picavet*-camera ensemble is mounted onto the kite's line. The kite is then fully raised up to about 150m off the ground. Note that the air, especially in mountainous areas is gusty, being even more gusty closer to the ground. The gustiness reduces as height is gained because the effects of the surface roughness decreases with height.

Note that in the event of lack of wind, the camera can be attached to the bag-pack whilst skiing down a slope. Hence, 'artificially' attaining the required 'apparent' wind speed for the kite to fly.

1.5.3 Equipment

Two cameras will be taken due to the high risk of kite crash. The camera mounted on the kite-*picavet* ensemble will be protected using a plastic casing. A lense repair kit will also be taken. In order to reduce the costs the IC RCC Go pro Hero camera will be taken together with the Go Pro Hero 2 which will be purchased together with IC Outdoor Club to reduce the cost. Two *Picavets* will also be taken together with a kite-*picavet* ensemble repair kit.

Chapter 2

Expedition Team

The team is comprised of four Imperial College Students, between 20 and 25 years of age. Including both post-graduates and undergraduates all in different scientific disciplines. All the members have notable mountaineering and skiing experience.

2.1 Sara Arbós i Torrent

Role: *Expedition Leader*

Age: 24

Academic Background: *M.Eng. (Hons.) Aeronautical Engineering (2009). Currently 3rd year Ph.D in Aeronautics. Both coursed at Imperial College London.*

Skiing Experience

Skiing from the age of 2 years old, with a wide range of experience in piste, off-piste and ski touring.

2011- Present - Many ski-mountaineering trips in the eastern Pyrenees both Catalan, French and Andorran. S3/S4 with small sections of S5.

April 2011 - Organiser of a hut-to-hut ski-mountaineering tour to the 4000ers in the Bernese Oberland. Summits include: Jungfrau 4158m, Monch 4207m, Finsteraarhorn 4274m, Gross Grunhorn 4044m, and Gruenegghorn 3860 (twice).

January 2011 - Eagle Ski Club tour to Three Valleys, mainly off-piste skiing and some ski touring. Including descents of Vallée des Avals and Col de Jean-Le Raffort.

2009 - Present - Lead and organised 4 down-hill skiing tours in, Andorra (twice), the Swiss Alps, St. Moritz (including the descent of the Morteratsch glacier) and the Dolomites (including the Marmolada descend and the Sella Ronda circuit).

February 2000 to 2004 - 1 week intensive downhill skiing course in La Masella and Porte-Puymorens.

Winter 1998 - Attended a full winter season down hill skiing course with the 'Centre excursionista d'Olot'.

Climbing Experience

Winter 2011 - 5 Days of Scottish winter climbing up to Scottish grade III.

2009 - Present - Many climbing trips across the UK both with the Imperial College London Outdoor Club and with various climbing partners.

2009 - Present - Number of trips sport climbing in the Northern part of Catalunya.

March 2010 -10 days Sport climbing tour to 'el Chorro', Malaga ,Spain.

July 2010 - Present - Climbing Instructor at Ethos Climbing Wall.

Comfortably lead climb traditional HS. And 6a in sport. Alpine climbing up to PD rock II.

Other Activities

Hiking in the Pyrenees (above 2800m) from the age of 7. Many trips both in the UK and Catalunya.

2004 - Present -Fell-Running. 2004 and 2005 winner of the Montsacopa Volcano Race, Olot, Catalunya.

September 2011 Run the 'Volcanic 13Km mountain Race' in Olot. *November 2011* Run endurance trail half



marathon in the Gower Peninsula, Wales.

2009 - Present - Canyoneering. Organised trips in a number of occasions in the Eastern Pre-Pyrenees and Pyrenees both in the French side and the Catalan side.

2011-Present - Numerous week-end trips Kite Surfing in the Northern Coast of Catalunya, *Costa Brava*.

Training

June 2009 - Conville Course.

September 2009 - CWA trained.

November 2010 and 2011 - attended Explore at the RGS.

March 2011 - Far From Help. First Aid in Remote environment qualification.

Relevant Positions

2011-present Imperial College Exploration Society Chair. In charge of organising international ice climbing and ski-mountaineering tours to Norway and the Alps. Organising lectures on exploration by external speakers as well as publicising expeditions within Imperial College.

2010/11 Treasurer of Outdoor Club In charge of the club's finances. Involved in the organising weekly trips to mountainous locations within the UK and instructing new members in the skills of traditional climbing, navigation, fell running and skiing.

Memberships

Aspirant member of the Alpine Club.

Member of the Eagle Ski Club.

Affiliated to the BMC.

Royal Geographical Society Post-Graduate Student Member.

Full member of 'Federació d'Entitats Excursionistes de Catalunya' and 'Federació Catalana d'Alpinisme i Escalada', (Catalan Mountaineering, Climbing and Alpine Clubs).

Full member of *FEDME* (Spanish Alpine Club) for which I hold a Federative License.

2.2 Boris Korzh

Role: Training and Equipment Officer

Age: 22

Academic Background: *MSci Physics 4th Year*

Skiing Experience

2009-present - Numerous single and multi-day ski-mountaineering trip in mountainous regions of France, Switzerland, Austria, Slovenia, Germany and Scotland. Highlights include successfully leading a team of 5 on the Haute route, Chamonix-Zermatt, unguided.

Climbing Experience

2007-present - Rock Climbing, comfortable leading E1/E2 in various locations and rock types. Most weekends visiting areas including North Wales, Peak District, Lake District and Yorkshire.

2008-Present - Regular winter climbing in Scotland and North Wales, leading routes such as Pillar Chimney (V, 6) and Clogwyn Left hand (V, 5).

2009-Present - Three alpine climbing seasons in Chamonix, completing over 15 routes, including the Frendo Spur on Aig. Du Midi (D+), North Face of Tour Ronde (D-) and an attempt on the Traverse of the Chamonix Aiguilles (ED1).



2010-Present - Two week-long trips to European Ice climbing destinations, leading routes up to WI5 and M6, such as Sabotorfossen (Rjukan).

2010 - Equipment officer on Imperial College Obra Valley Expedition to the Indian Himalayas. Achieved 3 first ascents of unclimbed peaks, unsupported. Maximum altitude of 5877m and difficulties of Alpine D-.

Other Activities

2009-Present - Competed in 6 mountain marathons located in Scotland and Wales. Personal best result within top 10, in the Elite category of the Lowe Alpine Mountain Marathon.

1995-Present - Regular Cross-Country, Backcountry and Downhill Skiing, in Canada, Germany, Italy, Scotland, Ukraine and Romania.

Training

2011- Received Outdoor Activities First Aid certificate, a prerequisite for the Expedition Medical Skills and Advanced First Aid course.

2011 - Completed Mountain Leader (Summer) training in North Wales.

2009 - Completed Jonathan Conville Trust Courses in Scottish Winter Mountaineering and Alpine Mountaineering in Chamonix.

2005-8 - Completed Duke of Edinburgh Award Scheme at Bronze, Silver and Gold Levels, taking place in locations around North Wales. Continued involvement with the scheme through organisation and invigilation of Bronze and Silver expeditions for the Air Training Corps

Relevant Positions

2009-Present - Committee member of the Imperial College Union Exploration Society, holding positions of Secretary and Treasurer. Organised international ice climbing tours to Norway and Slovenia, the latter joint with The Alpine Club. Involved in organising lectures on exploration by external speakers, for society members.

2008-Present - Committee member of the Imperial College Union Outdoor Club, holding positions of Equipment Officer and Secretary. In charge of organising weekly trips to mountainous locations within the UK and instructing new members in the skills of traditional and winter climbing, navigation, fell running and skiing. Involved in organising up to three international tours per year.

Memberships

Full Member of The Alpine Club.

British Mountaineering Council.

Austrian Alpine Club (British section).

German Alpine Club (DAV).

2.3 Samuel Thompson

Role: Medical and Communications Officer

Academic Background: *MSc Environmental Technology (Graduate 2011), Imperial College London. Currently a sustainability consultant for Accenture, based in London*



Skiing Experience

Winter 2008 - Spring 2009 - Ski Mountaineering in Alberta, Canadian Rockies.

2007-Present - European Alps Winter. Including Ski mountaineering/touring.

Climbing Experience

Winter 2008 - Spring 2009 - Ice climbing, mountaineering in Alberta, Canadian Rockies.

Summer 2009 - Indian Himalaya (First Ascent Expedition to Himachal Pradesh D highest point 6184m).

2007-Present - European Alps Summer.

2007-Present - Scottish Highlands. Including Ice climbing and mountaineering.

2000-Present - Climbed both traditional and sport styles in uncountable trips across the UK. As well as the Canadian Rockies, New South Wales (Australia) and the Alps

Lead grade on traditional gear: E1/E2 5b/5c. Sport: 6b/6c. Alpine lead standard is D / TD (around 60 routes ranging from PD - TD) Scottish winter standard = IV / V (around 30 routes ranging from II - V, mainly around III)

Training

Summer Mountain Leader Trained

Single Pitch Award Trained

Completed Yamnuska Mountain Skills Leadership Semester

CASI - Canadian Ski Instructor Award (Level 1)

80hr Wilderness First Responder

Emergency First Aid

CAA - Canadian Avalanche Level 1 & 2

Memberships

Alpine Club UK (Full Member)

Climbers Club UK (Member)

BMC (Member)

2.4 Arnaud Sors

Role: *Finance Officer*

Age: 22

Academic Background: *Ecole Polytechnique, France (2008). Currently MSc Student in Advanced Materials Science at Imperial College London.*



Skiing Experience

Long-time experience of ski and telemark-ski, mainly in the Alps.

2008-present - Numerous ski-mountaineering tours (4 to 7 days) including:

Ortles-Cevedale, Italy. Ski descent of numerous summits including Gran Zebru, 3851m

Ski tour across Corsica mountains, including Cinto, Rotondo etc.(6 days)

Ski tour across Belledonne range, Isere, France (4 days)

Ski tour across massif du Beaufortain, Savoie, France (5 days)

Ski tour across massif des Ecrins, Hautes Alpes, France (4 days)

Ski tour across Vallée des Merveilles, Mercantour, Argentera (4 days)

2005-present - Intensive practice of ski mountaineering mainly in the French Alps. Numerous ski-mountaineering

days and in various places. Good experience of steep skiing with various summits including original descent of Galetteau, Belledonne (5.2 E4). Classic ski ascents in the Alps: Grande Casse, Domes de Miage by the Glacier d'Armancette, Glaciers de la Vanoise etc.

Climbing Experience

2005-present - Rock Climbing. Sports climbing, trad climbing, and lots of multi-pitch routes in the Alps. Crack climbing in Texas. 7a on sight.

2008-Present - Ice climbing. Various routes mainly in the Hautes-Alpes (l'Argentiere, Ceillac, Ailefroide) and Ubaye regions. Up to grade 5 as a leader.

2008-Present - Mountaineering: up to TD. Classic routes, traversée de la Meije, Mont Blanc. Good experience of high altitude bivies. 2010 expedition to Fann Mountains in Tadjikistan in a team of 3 with trekking and alpinism, ascent of various summits up to D+ and 5000m elevation (Zamok, Kaznok, Alaoudin peak, summits around Archamaidon circus), including opening of a new route.

Winter 2008-2009 - 6 months in the French Alpine Troops in Barcelonnette, Ubaye, as a Junior Instructor for non mountain-trained troops. Various experience including snowcave building, survival instruction, night-skiing and mountain combat.

Other Activities

Lots of adventure races (running + mountain biking + canoeing). Winter mountain marathon. (Saint Lyon, 68km, ranked 104/4000)

Training

2008-2009 - First Aid Courses in the French Army.

Relevant Positions

2009- 2010 - President of the Alpine Society of Ecole Polytechnique. Organiser of numerous trips to the Alps.

Memberships

Member of the Club Alpin Francais

2.5 Jonathan Phillips

Role: Reserve

Age: 25

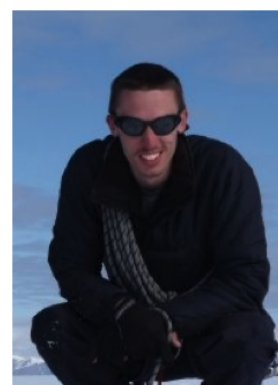
Academic Background:*Ph.D Student, Department of Material Science, Imperial College London. M. Eng Materials and Engineering, Imperial College London, Graduate 2008*

Skiing Experience

April 2011 - Hut-to-hut ski-mountaineering tour to the 4000ers in the Bernese Oberland. Summits include: Jungfrau 4158m, Monch 4207m, Finsteraarhorn 4274m, Gross Grunhorn 4044m, and Gruenegghorn 3860 (twice).

2009 - Present - Took part in 3 down-hill skiing tours in, Andorra (twice) and the Swiss Alps, St. Moritz (including the descent of the Morteratsch glacier).

Climbing Experience *2010* - Leader, Imperial College Obra Valley Expedition to Indian Himalaya. Completed 3 first ascents of unclimbed peaks, unsupported. Maximum altitude of 5877m and difficulties of Alpine D-.



2009 - Treasurer, Imperial College East Greenland Expedition, Successfully completing 3 first ascents of unclimbed mountains, unsupported, in the Arctic.

2006-present - Rock Climbing, comfortable leading E1 in various locations and rock types. Most weekends visiting areas including North Wales, Peak District and Lake District.

2007-Present - ICUOC Winter Tour, Scottish mixed climbing, leading IV, 6 in addition to several routes in Wales at a similar grade.

2007-2008 - ICUOC Summer Tours, each consisting of six weeks of alpine climbing including Mont Blanc (4807 m) by the Gouter Route, Mont Maudit via Frontier Ridge and Rebuffat E1/TD at >3400m. Also leading teams up to Dome de Neige des Ecrins (4015 m) and sport climbing in the valley to F6a.

2009 - 2011 - Climbing Instructor at Ethos Climbing Wall.

Other Activities

2003 - World Challenge Expedition, Northern Territory, Australia & experienced expedition logistics and worked as part of a 17 member team.

Training

2011 - Received Outdoor Activities First Aid certificate, a prerequisite for the Expedition Medical Skills and Advanced First Aid course.

2010 - Competed MLTE Single Pitch Award.

November 2009 and 2010 - attended Explore at the RGS.

2009 - Completed First Aid at Work qualification to become Departmental First Aider.

2000-2008 - Completed Duke of Edinburgh Award Scheme at Bronze, Silver and Gold Levels, taking place in locations around North Wales. Continued involvement with the scheme though and supervising other groups during their expedition phases.

Relevant Positions

2009-2010 - Chairman Imperial College Union Exploration Society organising one international ice climbing tour.

2008-2009 - Chairman, Imperial College Outdoor Club (ICUOC) - organised 2 international and 1 domestic mountaineering and climbing tours, in addition to 10 weekend trips.

Memberships

Full Member of The Alpine Club.

MLTE, Mountain Leader Registration

BMC affiliated

Chapter 3

Logistics

3.1 Maps and Navigation

The maps used for defining the objective area are,

- From www.mytopo.com.
- Bering Glacier maps C1, C2 and D1. Scale 1:63360.

The *Bering Glacier* maps have been consulted at the RGS library. US maps, as opposed to European maps, are catalogued using names rather than numbers. Hence, *Bering Glacier* is the name of the map for the desired area which scales 1:250,000. This is then divided into close up sections which scale 1:63360. We are interested in sections C1, C2, and D1.

Note that in the US the maps cannot have copyright. Hence, USGS struggles to make money out of them. Consequently, maps of remote areas are old and not updated very often. C1 and C2 were last updated in 1985. D1 was last updated in 1984.

All these maps have been purchased straight from USGS and we are now awaiting delivery.

Finally, a book of aerial pictures of the Wrangell Mountains by Rudi Homberger is also being consulted.

3.2 Getting Equipment to Alaska

All *non-Black Diamond* technical equipment will be flying with us as part of the airline luggage allowance. The stoves and fuel will be bought in Anchorage due previous difficulties encountered by past expeditions wishing to bring their stoves through US customs. The dehydrated food will be bought in the US and shipped to the charter plane pilot. This is due to the difficulty reported by previous expeditions of getting food through US customs. Finally, all Black Diamond equipment will be directly shipped to Anchorage as part of the offer agreement.

3.3 Terrain

The expedition will be on ice and rock for most of the time.

We will be travelling on glaciers where we will be setting our base camps. We will be operating on rocky terrain when ascending the objectives.

The gradient over glaciers is generally easy and a reasonable pace should be obtainable. Travelling on skis should ease and speed up the travelling progress. However, this pace might be limited by broken terrain, the lack of a path, and crevasses and moulins.

Previous expeditions in that area during the month of June have reported overall good snow conditions, with some areas of soft snow which were always manageable.

Moreover, one of these expedition reports also described the mountain faces. The North faces mostly very steep, glaciated and covered in icefalls. West faces are almost always glaciated and have the longest frozen spell on any given day. Generally, the sun peaks onto the West side of the peaks at around 8:30am, and often goes off them around 10pm. In contrast, the East faces receive first sun at 4 am until about 7pm. The South aspects tend to be melting, or melted out scree and snowfield slopes. The rock in the range consists mostly of shale, hence most of the rock faces are rather loose. The South gullies tend to produce a lot of avalanches.

3.4 Weather

The temperature range in June is very high. In the valleys the temperature varies from -5° to 15° . However, the glaciers we are planning to visit are at an altitude of about 1500m and the mountain objectives have altitudes between 2500m and 4000m. Therefore, the temperatures are expected to be between -20° to 5° .

The weather in June is reasonably stable, but in high latitudes and altitudes there is always an intrinsic instability. Hence, storms and white out might be experienced.

There will be about 19 hours of daylight during our stay, hence this will give us some flexibility in the choice of climbing periods.

Weather Stations and important Contact Details

Closest Weather stations:

- Chitina
- Cordova
- Glenallen
- Valdez
- Anchorage
- Burwash Landing, *Canada*.

Alaskan Weather Service:

- Anchorage, call: 266-5145
- Fairbanks, call: 458-3745
- Anywhere else in Alaska: 1-800-472-0391

3.5 Wildlife

The Wrangell - St. Elias National Park has a very diverse wildlife. The high country supports Dall Sheep and Mountain Goat and the green glacial valleys have bears, moose, wolf, and lynx. Therefore, the park strongly recommends to all its visitors to be aware of the wildlife that inhabits the park and its dangers. This section presents a brief outline of the two most dangerous animals. However, we are unlikely to encounter any of them at the area we are planning to visit.

3.5.1 Bears

Alaska is bear country and hence the risks and possibilities of encountering one must be taken into account. In the area visited there are records of both Grizzly/Brown bears and black bears. Polar bears are not found in the South Eastern part of Alaska.

Brown Bears inhabit most of Alaska's forests. But they do not tend to venture up high in the glacier zone. Thus, it is not probable that we will encounter any during our journey.

Black bears are most often associated with forests, but depending on the season of the year, they may be found from sea level to alpine areas.

Thus, several measures will be taken,

- Measures Before Departure:
 - Check recent bear activity with the Park officials and the Pilot.
- Measures While Travelling:

- Be vigilant and alert.
- Watch for fresh bear activity i.e. scat or bear tracks.
- Make plenty of noise while on trails.
- Stay away from dead animal carcass.
- Base Camp Measures:
 - Cook away from our tent.
 - Keep the rubbish packed and away from base camp.
 - Store the food in specially designed bear-proof containers.
 - Keep a clean camp and avoid smelly food.
 - Carry Bear Pepper Spray.
 - Carry a Flare gun.
 - Carry and air-horn.
- Measures in case of encounter:
 - Remain calm. The bear will most likely just be curious.
 - Bears can stand up on its two feet in order to get a better view. This should not be interpreted as an attack.
 - One should always behave as a human. Speak loud, wave arms. If the bear charges (charges are very rare and in most cases they are 'bluff charges') one should **NOT run**.
 - In case of an attack, bear pepper spray should be used. Its main component is a lachrymatory agent and has proved to be very efficient.

3.5.2 Moose

Moose inhabit woods and are found near streams or ponds. Thus, we are unlikely to find it during our stay up in the glaciers.

However, it should be noticed that although moose aren't inherently aggressive, they will defend themselves if they perceive a threat.

3.6 Pictures and Journal

One of the aims of the expedition is to produce a collection of pictures of the wildlife, flora and fauna of the area.

We will also take pictures of the nearby mountains for future mountaineering expeditions reference.

Moreover, we will be writing a journal to complete the expedition report upon our return.

3.7 VISAS and permits

To travel to the US it is required to have a ESTA waver VISA. This has a cost of \$14 per person. No further permits are required for European citizens on trips shorter than 90 days. Which is our case.

To visit the Wrangell - St. Elias National Park no permits are required. However, it is recommended to contact the local ranger to inform him/her of more involved mountaineering expeditions.

Note, however, that if the Canadian border is crossed and the Kluane National Park entered a permit must be secured in advance from the park's Superintendent.

3.8 Reducing our Impact

We want our expedition to cause minimal environmental harm, especially to the wild and remote regions of Alaska. The website of the Wrangell - St. Elias National Park and Preserve has detailed advice on what

to do and not do, which we will follow. Examples include not lighting fires close to vegetation and taking all garbage with us to either burn or dispose of after the expedition. Respect the wild animals and their environment. Moreover, the expedition will adhere to the environmental guidelines outlined by the British Mountaineering Council. The expedition will also conform to guidelines by Earth Watch International and the 'Leave no trace' philosophy (www.lnt.org) in order to minimise our impact. Solid human waste will be disposed of by burying away from water sources. Liquid waste will be disposed of locally away from water sources, the use of eco friendly cleaning agents and soaps should minimise environmental impact of this. Hazardous waste such as fuel will be disposed of at the first suitable location prior to any flight. Batteries will be returned to the UK for disposal. Plastic waste will be removed from the glacier and disposed of at the first suitable location, either Chitina or Anchorage; all remaining waste will be burnt. See 11.

Chapter 4

Finances

4.1 Currency

The currency of Alaska is the US Dollar, for which the current exchange rate is 1.6 USD to Pound Sterling. US Dollar is readily available and can be obtained in advance from most high street currency exchanges. ATM's are available in Anchorage and Chitina both en route to the our final destination. Whilst we will avoid carrying large amounts of cash it will be necessary to have all money for payment to local staff available.

4.2 Travel Expenditure

Please find the detailed break down of the expedition expenditure in section 10

4.3 Equipment Expenditure

Equipment costs will be reduced by borrowing items from the Exploration Board, Imperial College Fellwanderers, Imperial College Outdoor and Imperial College Recreational Clubs Committee Executive. Required personal equipment, for example, boots, down jackets, and down sleeping bags will need to be purchased. This can be costly and to reduce the financial burden the expedition will apply for discount rates and sponsorship from suppliers and national distributors as well as for any available equipment grants.

4.4 Income

The expedition will apply for expedition approval and financial assistance from the following organisations and awards:

- Imperial College Exploration Committee
- Old Centralians
- IC Trust
- RCSA trust
- Gino Watkins Award
- Courtauld Trust
- Andrew Croft Memorial Trust
- Mount Everest Foundation
- Alpine Ski Club
- The Alpine Club
- The BMC

The expedition is also applying for discounts from Montane, Exped, Paramo, Cotswold, PhD, Dynafit, as well as equipment grants such as Lyon award, First Ascent award and the Mountain Boot Company in order to reduce the cost of required personal equipment. We are also applying to Mountain House and Go for discounts in dehydrated food and energy drinks and bars as well as to several airlines to reduce the travel costs.

Any deficit in funding will be covered by the members of the expedition team. Each member will need to contribute at least £500 to the expedition.

So far the expedition has been awarded £300 from the Eagle Ski Club Memorial Fund Award, has won the Lyon Award and has been offered 40% to 50% discounts on all Black Diamond equipment.

Chapter 5

Equipment

5.1 Clothing

Clothing systems will be similar to those used for Alpine climbing, with a layered approach for maximum versatility. Due to the unpredictable and fast changing weather patterns, plenty of insulating and waterproof layers will be carried at all times. For drier but colder weather, in which wind chill should be a major consideration, down jackets will be used. Extremities will be kept well protected using mitts/balaclavas whenever risk of frostbite is possible. Extra layers will be removed when necessary to minimise perspiration and then risk of hypothermia from damp clothes when stationary. Some members will require down jackets and other clothing items to be purchased but these are easily available from UK retailers. During milder conditions where there is a risk of precipitation, synthetic insulation will be used, which preserve insulating qualities even whilst wet. Montane produces a large range of high quality and affordable insulating garments and we will endeavour to establish a sponsorship agreement. Softshell salopettes will be used for leg cover since they are windproof, water resistant and provide excellent insulation. Such trousers normally have an internal gaiter which works well with climbing/ski boots. Woollen leggings will be worn as a base layer. Waterproof trousers will also be carried for more extreme conditions.

5.2 Skis

Skiing will be the primary method of travelling across glaciated terrain due to the large snow falls within the proposed area. This has the advantage of providing an efficient way of approaching the objective climbs in addition to enabling fast descents. Due to the reduced pressure exerted of the ground whilst using skis, travelling over crevasses is much safer, however the team will still rope up when there is a significant risk of crevasses. The skis will be of the type used for Alpine Ski Touring, which strikes a balance between weight and control whilst skiing downhill. Most of the team will use Fritschi type bindings which allow quick change between uphill (walk) and downhill (ski) mode. These bindings also possess a full release system with a DIN rating, therefore greatly reduce the risk of injuries during falls. During ascent, skins are attached to the bottom of the skis in order to achieve traction on snow slopes of up to 40 degrees whilst still allowing forwards glide motion. Skis will be used for ascents up to a point where it is no longer safe or efficient to make upwards progress through the use of kick turns, at which time they can be left behind of attached to the rucksack whilst continuing by foot. Whilst encountering icy conditions, Harscheisen (Ski Crampons) will be attached to the bindings to improve security on steep ground. All of the members already have their own touring skis, however most of the members would prefer to purchase lighter skis in order to increase efficiency. We will submit applications to receive discounts for such equipment.

5.3 Boots

The team will use ski mountaineering boots which are compatible with ski bindings. Such boots usually have a Vibram sole which enables them to be used as climbing boots and they also accept crampons. The main difference from standard ski boots is that they can be switched between a ski mode (stiff) and a walk mode (flexible). The double boot design is ideal for expedition use since it provides a warm system and it is possible to put the inner boots inside the sleeping bag whilst sleeping, to prevent them from freezing over night. The only issue with such boots is that they can be quite heavy compared to standard mountaineering boots, however, modern boots are becoming significantly lighter. As an example, Scarpa Maestrale ski boots weigh about 1.5kg per boot compared to 1.2kg (La Sportiva Spantik), which is very acceptable. Standard double boots may also be taken if we decide that the technical difficulty of the proposed objectives will require this. We hope that consultation of the aerial photographs in the Ruedi Hombergers 'My Warangell Mountains' book, will clarify this.

5.4 Pulk System

The intention is that an air taxi will drop us off in close vicinity of our base camp, hence we will not be required to travel large distances with all of the equipment and food. Because of this we do not intend to purchase pulks, which would add a considerable cost to the expedition. Instead we will adopt a system of pulling plastic sleds which we will be able to obtain for free from the pilot.

5.5 Tents and Sleeping

Two identical 2-man expedition mountain tents will be used (Terra-Nova Quasar or similar) which will enable more flexible climbing teams if required. This type of tent is also just about large enough to fit all four team members if one is irreparably damaged for some reason. It is the intention that these will be borrowed from the Recreational Clubs Committee, the Outdoor Club or the Exploration Board. Expedition grade down sleeping bags will be taken of suitable warmth for the night-time temperatures down to - 15, with additional allowance for sitting out bad weather or nursing a casualty. These will need to be purchased for some of the team members but are easily available from UK suppliers. Peter Hutchinson Designs specialise in high quality down software and their Hispar range of sleeping bags is ideal, due to their unmatched warmth to weight ratio and a water resistant outer fabric. Past Imperial College expeditions have a good history of receiving discounts from the company and it is hoped that a deal can be struck once again. For ground insulation each member will use an Exped DownMat 7 Pump as it loses 3X less heat than regular mats. This is a particularly important consideration to prevent heat loss when sleeping on a glacier or in bivouacs up high.

5.6 Climbing Equipment

Aside from the essentials such as harness, helmet, ice axes (pair), crampons, half ropes the selection of climbing equipment carried will depend ultimately on the inspection of the routes to be encountered. Rockier routes will require a larger selection of nuts, hexes, camming devices and pitons. Mountaineering style ascents will require more snow and ice protection such as snow stakes, deadmans and ice-screws. Much, if not all, of the climbing equipment is already owned by team members, only snow and ice protection will need to be obtained, it should be possible to borrow this from the ICU Outdoor Club.

5.7 Avalanche Rescue Equipment

Since the team will be spending a lot of time on snow and ice, there may be risks of avalanches. Each member will carry the appropriate avalanche safety equipment at all times. This includes an avalanche transceiver, snow shovel and a snow probe. A few of the members already have this equipment, however it will also be possible to borrow all of this from either the Exploration Board or the Outdoor Club.

5.8 Cooking Equipment

Two identical liquid fuel stoves will be taken (Primus Omnifuel) which are suitable for burning all available fuels. These stoves will be used mostly at base camp for general cooking and melting water. They will be bought at REI stores in Anchorage due to US customs limitations. Cleaning stoves equipment will be taken, as previous experience and other expedition reports highlight that they are susceptible to frequent blockage especially with avgas. Two Jetboil gas stoves will also be taken for use at advanced camps and bivouacs due to their ease of use and high fuel efficiency. They possess an especially compact design and are optimised for boiling water, which is the only requirement whilst up high due to the use of dehydrated meals. Jetboils were used on the 2010 Obra Valley Expedition and they operated well for boiling water at the advanced camps at 5000m and in temperatures as low as -15 degrees.

5.9 Communications

The expedition will be carrying two-way radios for communication between climbing pairs. For communication with the outside world, a satellite phone will be held at base camp. An Iridium pre-paid SIM card will be obtained. Consideration will be given to the cold temperatures that may affect battery charging and operation. A solar panel

will be used to charge the battery as necessary.

For emergency purposes, an EPIRB (emergency position-indicating radio beacon) will be taken to assist evacuation in extreme situations. The EPIRB and satellite phone will be borrowed from the Imperial College Exploration Board. We will also be taken a GPS device which we will borrow from the Exploration Board.

Finally, we will be also carrying PMR 446 radios for inter-team communication and we will schedule for radio calls if team separates.

Chapter 6

Consumables

6.1 Food

Sufficient intake of calories will be vital whilst spending prolonged periods of time in cold temperatures and under physical exertion. The aim will be to consume over 4000 calories per day. It will be important to introduce as much variation as possible in order to increase enthusiasm to intake enough nutrition. Here is an outline of the various foods that we will take for our time at base camp.

Breakfast - porridge, nuts, raisins, sugar.

Lunch - noodles, pate, oatcakes, crackers.

Dinner - smash, couscous, pasta, corned beef, spam, tuna, bolognese/chilli sauce.

For mountain days we will take freeze-dried meals and puddings which are very light and have high calorie content. Such meals are extremely quick and easy to prepare, only requiring 300-500 ml of boiling water to be poured into the foil bag, whilst the puddings simply require cold water. From past experience Be-Well and Mountain House both produce great tasting meals in a variety of flavours at an affordable price. The 2011 Reru Valley expedition received discount from Mountain House, which we also hope to negotiate. Whilst away from base camp we will not cook for breakfast or lunch, instead consuming things such as cereal bars, biscuits and chocolate. The 2010 Obra Valley Expedition relied greatly on SIS Go Bars, which are energy bars made entirely from fruit and oats, providing the much needed vitamins absent from the rest of the proposed nutrition. This will enable us to eat breakfast whilst remaining in the tent and lunch whilst on the move or during breaks, saving time and energy. Below is an approximate day bag for a climbing team of two: 2 freeze-dried meals, 2 freeze-dried puddings, pack of nuts & raisins, 4 cereal bars, 4 fruit bars (SIS Go Bars), 2 packs of biscuits, 1 chocolate bar, 1 savoury snack (pork scratching or similar).

6.2 Water and Drinks

Water will be obtained by melting snow or from melt-water streams at lower altitudes. The water requirements for each member will vary. Guidance from the Royal Geographical Society Expedition Handbook suggests the fluid requirements are 4 litres a day, with one extra litre for every hour of exercise. We will take these recommendations very seriously and closely monitor our hydration levels during our mountaineering activities. We will take isotonic drink powders (SIS or similar) to enable fast rehydration and extra energy intake. A recovery drink will also be consumed just before sleep when undertaking multi-day routes.

6.3 Fuel and Gas

Fuel and gas will be purchased in Anchorage and stored in approved containers. From previous experience with the Primus Omnifuel and guidance from the Royal Geographical Society Expedition Handbook, 0.33 litres of petrol is required per stove per day if no running water is available in nearby streams. Therefore, we will require 0.66l per day (as we are taking 2 stoves). The price of fuel is around £1.8 per litre. We will also be using 2 Jetboils, its manufacturers state that a 100g canister is sufficient to boil 12 litres of water in normal conditions. Since we will be melting water first, we will take a 250g canister per 12 litres of water to be boiled.

Chapter 7

Medical and First Aid

7.1 Expedition Medicine

During the expedition we will be far from help. As such the team must be prepared to handle the injuries and health issues we might face during the expedition.

All members of the team are qualified in Emergency First Aid at Work and possess relevant awards. One member also has advanced first aid in wilderness environments (Wilderness First Responder). The First Aid kit list below is based on the 2004 Trans Greenland expedition, RGS Expedition Medicine, and an accumulation of previous expedition reports from the Alaskan ranges.

7.1.1 Antibiotics

Amoxicillin 250mg Capsules

Flucloxacillin 250 mg Capsules

Ciprofloxacin 1 × 7 day course, good for chest/urine infection

Augmentin 2 × 5 day course good for chest, abdominal infection, urine

Fluconazole 1 × 7 day course anti-fungal, good for thrush etc

Flucloxacillin (skin infection)

Metronidazole (200mg) 4 × 4 day course for abdominal abscess or anaerobic gum infections

Augmentin (500mg) 3 × 5 – 7 day course for dental swellings and pain

7.1.2 Creams and Ointments

Burneze Spray 60ml – Taken for stove burns

After sun 200ml

Canesten Cream 15mg – Anti-fungal cream

E45 Cream 50g – Used a little on sunburnt ears, better moisturisers may be available.

Savlon Cream 60g – Effective on ice grazes and more serious blisters.

7.1.3 High Altitude Drugs

Acetazolamide 250mg – Acute Mountain Sickness.

Nifedipine 20mg – High altitude pulmonary and/or cerebral edema.

Dexamethasone 4mg – High altitude pulmonary and/or Cerebral edema.

7.1.4 Dressings and Instruments

Antiseptic Cleansing Wipe (20)

Blister plasters – Need to be warmed before application.

Cotton Wool

Crepe Bandage 7.5cm (4)

Dental kit – Prevention: mouthwash (peroxide), toothpicks, dental floss. We can't do more than treat inflamed gum and chronic toothache with antibiotics. A broken tooth or lost filling can be treated with temporary filling materials. Antibiotics (see above), temporary filling materials: dycal and cavitec, flat bladed plugger, mixing spatula, dental mirror, cotton-wool rolls.

Eye Dressing (2)

Gauze Swabs $5 \times 5\text{cm}$ (8)

Melolin Dressing, Adhesive (10) – Great for putting on sore heels to prevent blisters. Melolin Dressing, Non-Adhesive (5) – Adhesive ones used in preference for blistered heels

Plasters, Adhesive, Assorted (50)

Paperclip – can be used to pierce through nails to treat a blood blister under the nail.

Scissors, Medical

Splint or fibre glass canoe repair kit (could also be used to repair pulks)

Steri-strip Large (3)

Steri-strip Medium (10)

Suture kit – 2 small vials of local anaesthetic, a few sutures, and a needle and syringe for the anaesthetic (provided we learn how to suture cuts and wounds). Also bring steristrips and skin glue.

Thermometer, Forehead – Medically proven to be as accurate as a rectal thermometer. Not used.

Triangular Bandage – A couple amongst the group are essential.

Safety Pins (20) – Can be used in many situations

Survival Blanket – Multitude of uses

Zinc Oxide Tape 25mm x 5m – Used to tape up feet to prevent blisters.

7.1.5 Painkillers

Aspirin 300mg Caplets (16) – For small pains

Aspirin 75mg Caplets (100) – To prevent frostbite

Ibuprofen 500mg Tablets (32) – For sore muscles, tendons and joints, also anti-inflammatory

Co-codamol 30/500mg (32) – Very strong painkiller

Tramadol 100mg – strong pain killer. (Use for severe accidents or heart attack. Use only when considering evacuation)

7.1.6 Other Medication

Dioralyte Sachets (20) – Rehydration sachets.

Duclolax 5mg (20) – To cure obstipations. Drinking enough should also help.

Diclofenac 50mg tablets (16) – Strong anti-inflammatory. Should be avoided when having stomach ulcers or asthma

Epipen – To help treat anaphylactic shock. Needs to be kept at body temperature/next to body. Lipase food supplement - To help digest our food and get more calories out of it.

Lopramide

Haemorrhoid cream (Anusol)

Chloramphenicol & Tropicamide (soothes snow blindness)

Otrivine nasal spray

Strepsils

7.1.7 Personal First Aid Kit

Adhesive plasters

Antiseptic fluid

Aspirin

Ibuprofen

Personal medication (inhalers etc)

Sun cream

UV block lip balm

7.1.8 Travel Health

Alaska requires no additional immunisations. All team members have completed childhood courses against MMR, Diphtheria, Tetanus, Polio, and Meningitis C.

7.1.9 Important Medical Contacts

Hospitals

Closest Hospitals are located in Anchorage, Fairbanks and Jenau.

Medical Centres

Cross Road Medical Centre, Glenallen.

Mile 187 Glenn Highway

PO Box 5

Glenallen, AK 99588

Phone: 907-822-3203

Fax: 907-822-5805

Chitina Health Clinic

Mile 28.7 Edgerton Highway

Chitina, AK 99566

Cordova Community Medical Centre

PO Box 160

602 Chase Avenue

Cordova, Alaska 99574

Phone: 907-424-8000

Fax: 907-424-8116

Emergency Rescue Contacts

Awaiting for the recommendations from the Chitina Rangers and the Visitors Centre of the Wrangell- St. Elias National Park.

UK Medical Contact

The expedition is thankful to Dr. Chris Imray who will be our UK emergency contact.

Chapter 8

Training

The team is continuing to train indoors and outside with regular indoor climbing training and a mountaineering-tailored gym regime focusing on strength and endurance. This also complements the mountaineering and outdoor training gained during weekend trips. All members of the team already have a good base level of fitness through personal training regimes such as running, cycling and swimming. This will be supplemented by weekly team training sessions in Hyde Park or Richmond Park throughout the Spring and Summer terms. These weekly sessions will also act as team building exercises to ensure smooth team dynamics in adverse conditions.

8.1 Proposed Short/Weekend Trips

Each member of the team will be responsible for organising at least one training weekend to make them comfortable in a leading role within the group and to make them more confident with logistics and communication.

Several members will be competing in mountain marathons during the course of the year which will help to maintain a generally high level of hill fitness.

8.2 Proposed Long Training Trips

Prior to departure the team will complete a series of week long trips to consolidate specific skills and to further build team spirit. Here is a list of the trips which each member will aim to attend:

- **Resort/off-piste skiing** (*Dec/Jan 2011/12*) - each member will endeavour to do at least one week of skiing from a resort, organised individually.
- **Scottish winter climbing** (*Jan 2012*) - ICU Outdoor Club winter tour to the Cairngorms. This will include some winter camping.
- **Ice & mixed climbing** (*Feb 2012*) - ICU Exploration Society winter tour to Rjukan, Norway.
- **Ski Touring** (*April 2012*) - ICU Exploration Society Easter tour, carrying out a multi-day hut-to-hut tour in the Alps.

8.3 First Aid Training

- **Marlin Outdoor First Aid** \Rightarrow 6th and 7th of February. Required to be able to attend Expedition Medical Skills and Advanced First Aid course. Will be attended by Arnaud and Sara. The rest of the expedition members are already qualified
- **Marlin Expedition Medical Skills and Advanced First Aid** \Rightarrow 24th and 25th of March. Will be attended by Boris, Arnaud and Sara

Chapter 9

Risk Assessment

This risk assessment has been divided into two broad categories that encompass the risk involved with an expedition of this type, namely the risks associated with altitude, and the risks associated with general mountaineering and ski touring in a glaciated region. This risk assessment is intended to be dynamic and will be amended as required. Note that all the information on avalanche safety is located in appendix C. Also Appendix ?? contains the safety procedures and protocols.

Notes on Risk Factors

The idea behind using risk factors is to provide a combined evaluation of the significance of a risk to expedition members and thus enable them to prioritise preparations and actions when trying to mitigate these. Both 'Likelihood' and 'Seriousness' of the consequences arising from a hazard are expressed on a scale between 0-5; these are then multiplied to give the combined 'Risk Factor', indicating the relative importance of addressing each risk.

9.1 Hazards Associated with Altitude (Medium to High)

Hazard	Symptoms	Consequences	Prevention	Response	Likelihood	Seriousness	Risk Factor
Mild Acute Moun- tain Sick- ness (AMS)	Headache. Dizziness. Fatigue. Shortness of breath. Loss of appetite. Nausea. Disturbed sleep. General feeling of malaise.	Mild decrease in levels of concentration and performance	Increase altitude by max. 1000m every 3 days. Allow 1 rest day for every 1000m altitude gain. Acetazolamide may be taken to aid acclimatisation, normally 250mg twice daily.	Rest at current altitude - no further ascent until symptoms resolve. Simple analgesia.If no improvement, descend.If worsens, descend and begin treatment with acetazolamide 250mg twice daily.	3	3	9
Mod- erate / Severe Acute Moun- tain Sick- ness	Mild AMS that is not improved with 24hr rest/analgesia. AMS symptoms of increasing severity.	As above. Normal activity may become more difficult. Member might have to be aided by others.	As above	Descend to altitude below that where symptoms began. Begin treatment with acetazolamide 250mg twice daily. Consider dexamethasone 4 mg four times daily	2- 3	4	8- 12

Hazard	Symptoms	Consequences	Prevention	Response	Likelihood	Seriousness	Risk Factor
High Altitude Pulmonary Edema (HAPE)	Fluid build up in the lungs	Shortness of breath at rest. 'Tightness' in the chest. Marked fatigue. A feeling of impending suffocation at night. Weakness. A persistent cough bringing up white or pink, watery, or frothy fluid. Confusion and irrational behaviour are signs that insufficient oxygen is reaching the brain.	As above	Immediate descent. Maintain upright position. Dexamethasone 4 mg four times daily. Consider nifedipine 20 mg slow release four times daily. Evacuation to a medical facility for follow-up treatment.	2	5	10
High Altitude Cerebral Edema (HACE). Increased pressures on Brain, due to swelling tissue as a result of fluid leakage inside the skull.	Symptoms can include headache, loss of coordination (ataxia), weakness, and decreasing levels of consciousness inc. disorientation, loss of memory, hallucinations, aggressive behaviour, and coma.	As for Severe AMS plus: Impaired Cerebral functions. Coma. Death.	As above	Immediate descent. Dexamethasone 4 mg four times daily. Consider nifedipine 20 mg slow release four times daily. Evacuation to a medical facility for follow-up treatment.	2	5	10
Periodic breathing during sleep	Periodic breathing during sleep, in the absence of cranial trauma, is normal at high altitude	-	-	-	4	1	4

9.2 General Mountaineering and Ski Touring Considerations

These have been subdivided into five sections:

1. Risks of equipment failure
2. General risks associated with the outdoors
3. Risks associated with steep ground
4. Risks associated with ski touring
5. General travel risks

9.2.1 Equipment

Risk	Consequences	Preventive Measures	Likelihood	Seriousness	Risk Factor
Stove Breakage	Inability to cook and melt water	Take maintenance and repair kit for stove, including spare parts. Take two identical stoves, so should one fail within the group one operational stove may be constructed. All equipment will be checked to make sure everything is operational and in good working order, prior to expedition.	2	3	6
Fuel loss / leakage	Unable to cook or melt snow. Potential fire or explosion causing serious injury.	Visual and frequent checks of stoves and fuel bottles. Use several fuel containers and fill stove bottles with funnels. Stoves filled with fuel every morning where possible. Only use appropriate fuel containers.	1	3	3
Suffoca- tion (from CO or burial)	Death	Ensure tent is well ventilated. Never do tent zips up fully or cook inside snow holes or other unventilated refuges to prevent carbon monoxide poisoning. Clear heavy snowfalls regularly from tents to prevent the danger of asphyxiation and damage to the tent. Do 'dig-up' snowholes rather than cave-style 'dig-ins' when possible.	1	5	5
Tent loss / breakage	Breakage: Repair. Loss of tent: All persons in one shelter.	All persons will assist with tents in bad weather. In extremely high winds a snow hole or bivouac bags will be used. Appropriate spares and repair kits to be carried. Tents will be checked long before we depart to ensure they are fit for the mountain environment and tents will be secured using snow stakes / ice screws.	1	4	4

9.2.2 Outdoor Related Risks

Risk	Consequences	Preventive Measures	Likelihood	Seriousness	Risk Factor
Disorientation and loss of Direction on the mountain	Possible exposure.	Frequent reference to compass and GPS units. Ensure navigation is shared amongst group and that those not on the mountains know your route and plans. Navigational skills will be refreshed and improved prior to departure.	2	3	6
Exhaustion, fatigue, dizziness	Lowered core body temperature. Irritable and irrational behaviour. Possible stumbling or falling.	Frequent and adequate rests. Agree flexible climbing schedule. Party moves at the slowest person's pace. Over-compensate on food and fuel supplies. Take lightweight and high energy food products to ensure weight is minimised and calorific value is maximised.	2	3	6
Dehydration	Headaches, dizziness, stumbling.	Regularly and frequently take in liquid. Drink at least 3-4 litres of fluid per day. Ensure group has sufficient fuel to melt snow.	2	3	6
Sun / Snow / wind burn and blindness	Sores, scars, blisters, open wounds, blindness.	Wear sun cream or sun block, lip balm, sunglasses, and sunhat. Team members check each other visually for exhaustion, hypothermia, frostbite and snow burn. Keep limbs covered while on snow / ice, even on cloudy days.	3	2	6
Hypothermia and exposure	Erratic and irrational behaviour, uncontrollable shivering, pale and blue extremities, lowered core body temperature, possible death.	Wear sufficient warm, waterproof and windproof clothing. Always carry spare clothing, and change out of any wet clothing. Do not stay exposed to the wind, and insulate any affected persons. Suitable clothing will be carried to ensure all team members will be sufficiently warm in the harshest of conditions.	2	3	6
Bad Weather	Difficult navigation. The team may become tent-bound.	Refer to compass and GPS units frequently. Share navigation between the group and plan for contingency days, ensuring adequate food / fuel is on the mountain. Take plenty of GPS batteries and carry emergency communication equipment.	3	2	6

Risk	Consequences	Preventive Measures	Likelihood	Seriousness	Risk Factor
Unable to adapt to high altitude physical demands	Impact on climbing schedule.	Undertake physical training to ensure all members are physically capable to endure the expedition [using training schedule developed by the Team]. Preparedness to adjust altitude gain schedule and descend if necessary before going higher. Undertake suitable acclimatisation schedule).	2	4	8
Tripping over guy lines / equipment	Sprained, twisted, fractured or broken ankle or knee. Other injuries.	Never venture out alone. Be observant. Use markers to map designated walking areas around the camps.	3	3	9
Frost bite	Inability to walk or climb effectively. Pale, blue, purple or black and swollen extremities. Potential loss of affected extremity.	Wear sufficient warm and waterproof clothing on extremities. Change out of wet clothes. Get out of wind. Maintain blood supply to extremities.	2	4	8
Small accidents (e.g. cuts, sprains)	Inability to use affected part of body.	Exercise caution at all times, all members will be proficient with the equipment and the techniques used and in first aid techniques.	2	2	4
Larger injuries (e.g. severe bleeding, fractures)	Possibly serious and permanent injury if no medical assistance sought.	Never 'work' alone, exercise caution at all times, all members will be proficient with the equipment and the techniques used and in first aid techniques.	2	4	8
Injury sustained by lifting heavy packs	Strain and or muscular damage. Inability to complete daily tasks and load carrying.	Distribute loads between the group based on abilities of each member.	2	4	8

9.2.3 Step Ground

Risk	Consequences	Preventive Measures	Likelihood	Seriousness	Risk Factor
Avalanche / Serac fall (see Appendix C)	Destruction of climbing camps. Burial of, or impact with, an expedition member. Possible death.	Awareness of weather conditions and snow stability. Cautious route planning. Avoid crossing and camping under seracs, check camp and tent locations with regards to avalanche risk and seracs fall risk. Be prepared to descend to avoid hazardous snow conditions.	2	5	10
Slipping / falling on ice	Grazes or cuts. Possibility for a sustained fall leading to Larger Injuries (see Outdoor Related Risks)	Always wear gloves on snow/ice. Wear long sleeved tops. Wear sturdy boots. Use crampons and ice axes. Extreme mixed/ice climbing will be avoided whenever possible.	2	5	10
Falling in a crevasse	Becoming cold, hypothermia, going into shock, cuts and grazes, fractures, unconsciousness, death. Inability to rescue ones self.	Careful route choice across and around crevasse fields and ice falls. Everyone to be competent in crevasse rescue techniques. Rope up where the terrain dictates. Refresher session to be run prior to expedition.	2	4	8

9.2.4 Skiing Risks

Risk	Consequences	Preventive Measures	Likelihood	Seriousness	Risk Factor
Avalanche / Serac fall	Destruction of climbing camps. Burial of, or impact with, an expedition member. Possible death.	Awareness of weather conditions and snow stability. Cautious route planning. Avoid crossing and camping under seracs, check camp and tent locations with regards to avalanche risk and seracs fall risk. Be prepared to descend to avoid hazardous snow conditions.	2	5	10
Falling whilst skiing	Potential for serious injury placing the individual and team in a emergency rescue situation.	Awareness of own capabilities and careful route planning. Avoid skiing routes / lines that are too difficult. Make sure the less proficient skiers go in between the leader and tail person. Make sure each member is confident skiing with a heavy pack (pre-expedition training).	2	4	8
Falling in a crevasse	Becoming cold, hypothermia, going into shock, cuts and grazes, fractures, unconsciousness, death. Inability to rescue ones self.	Careful route choice across and around crevasse fields and ice falls. Everyone to be competent in crevasse rescue techniques. Rope up where the terrain dictates. Refresher session to be run prior to expedition.	2	4	8

9.2.5 Wildlife Risks

Risk	Consequences	Preventive Measures	Likelihood	Seriousness	Risk Factor
Bear Base Camp Attack	Destruction of climbing camp, gear and food supplies.	Use dry food. Store food in bear proof containers away from the base camp (at least 100m). Keep the base camp clean. Cook away from the base camp. Stay away from animal carcasses. Keep rubbish in sealed containers away from the camp.	2	3	6
Bear Personal Encounter / Attack	Potential for serious injury placing the individual and team in a emergency rescue situation. Potential Death.	Check with Park officials fore recent bear activity. Watch for bear signs. Make noise on the trail. Do not travel alone. If you encounter a bear: Keep calm. Behave as a human speak loud and wave your arms. If the bear charges one should not run . In case of an attack, bear pepper spray should be used. All members of the party will carry a can of bear pepper spray. An air-horn and flare-gun will also be carried.	2	4	8

9.2.6 General Travel Risks

Risk	Consequences	Preventive Measures	Likelihood	Seriousness	Risk Factor
Car Crash	Serious Injury or death, loss of equipment	Use recommended drivers, remain alert during journey	2	3	6
Theft / Mugging	Loss of property, personal injury	Travel in towns according to FCO advice and use common sense. Remain in a group at all times.	1	2	2
Theft from BC	Loss of property	Hide sensitive materials or carry on person during the climbing phases.	1	3	3

Chapter 10

Budget

The budget features all the considerable and vital expenditure. The prices quoted include the discounts obtained through the Lyon Award as well as the especial discounts offered by Black Diamond.

prices for some items of equipment and travel and

Some items are still unaccounted for as the price is still to be determined Prices of the items listed include Black Diamond discounts and Lyon Award. We are still awaiting for some discounts from some brands including PhD, Paramo, Montane, Dynafit, REI, Airlines and Mountain House, these will determine our final product choice.

Section	Price (£)	Quantity	Total (£)
Transport			
London - Anchorage (Return)	750	4	3000
<i>extra luggage</i>	50	4	200
Anchorage - Chitina - Destination (Return)	707	4	2828
ESTA visa	21.75	4	87
sub-Total	<i>1528.75 per person</i>		6115
Accommodation			
Anchorage (<i>6 nights</i>)	<i>50 (per room)</i>	6	300
sub-Total	<i>75 per person</i>	-	300
General Equipment			
Maps	13	4	52
Books	35	2	70
Crevasse rescue kit	From OC	1	Free
Avalanche Rescue Kit	From Explo Board	-	Free
First aid supplies and medication	100	1	100
Solar panel	95	1	95
Satellite phone	From IC	1	Free
Satellite phone minutes	250	75min	250
Fuel for stoves	30 litres	1.8 £ per litre	54
Primus Omnifuel Stoves	100	2	200
Down jacket	250	3	750
PhD Hispar 600 Down sleeping bag	450	2	900
Exped Downmat 7M	70	2	140
Bivibag	from OC	4	Free
Black Diamond PRIME Boots	250	4	1000
Black Diamond Stigma Skis	260	4	1040
Dynafit Bindings	250	4	1000
Skins	70	8	560
Ski crampons	40	4	160
Ski-Boor Leash	10	4	40
Boot Crampons	60	2	120
Snow probes	From OC	4	Free
Snow shovels	From OC	4	Free
Petzl Quark Ice axes	115	2	230
Rope	From OC	2	Free
CAT4 Sunglasses	100	1	100
Tents (Terra Nova Quasar)	From OC	2	Free
Climbing hardware (pegs, ice screws, snow saw...)	100	1	100
Plastic Sleds <i>for pulk system</i>	From Pilot	4	Free
Bear proof food containers	From Pilot	2	Free
Anti-Bear Pepper Spray	From Pilot	4	Free
Flare gun and red flares	TBC	1	TBC

Air-horn	TBC	1	TBC
sub-Total	1740.25 <i>per person</i>	-	6961
Food			
Dehydrated food	200	4	800
Normal Food	70	4	280
sub-Total	270 <i>per person</i>	-	1080
Training			
Marlin Expedition First Aid level 1	50	2	100
Marlin Expedition First Aid level 2	50	3	150
sub-Total	62.5 <i>per person</i>	-	250
Research and Communications			
Power Monkey	25	1	25
Power Sled Kite	40	1	40
Picavet (Camera Balance holder)	40	1	40
Go-Pro HD Hero Camera	130	2(1 free from RCC)	130
Tripod stand	8	1	8
Camera HD protection case	26	1	26
LCD BacPac	51	1	51
Re-chargable spare battery	13	1	13
16GB SD Memory Card	26	2	52
sub-Total	90 <i>per person</i>	-	360
Grand Total	3766.5 <i>per person</i>	-	15066

Chapter 11

Bibliography

11.1 Institutions and Resources

- **Alpine club** - Library and Past Expedition Reports
- **RGS** - Library and Past Expedition Reports

11.2 Web Pages

11.2.1 Safety

- **AIARE** - The American Institute for Avalanche Research and Education - www.avtraining.org/StudyMaterial.pdf
- **CSAC** - Avalanche Center - www.avalanche-center.org/Education
- **BMC** - British Mountaineering Council - www.thebmc.co.uk
- **BMC** - Winter skills talk - 2005 December
- **MCofS** - The Mountaineering Council of Scotland - www.mountaineering-scotland.org.uk/leaflets/avalanche.html

11.2.2 Climbing area and Objectives

- **American Alpine Journal** - www.americanalpineclub.org/p/aaaj
- **Mount Everest Foundation** - www.mef.co.uk
- **Alpine club** - www.alpine-club.org.uk
- **RGS** - www.rgs.org
- **Wrangell National Park** - www.nps.gov
- **Alaska National Weather Service** - www.arh.noaa.gov/obs.php
- **Photos** - MarculescuEugenIancuD60 - www.flickr.com/photos/415384/page104/

11.2.3 Equipment

- **Ph Designs** - www.phdesigns.co.uk
- **The outdoorshop** - www.theoutdoorshop.com
- **Black Diamond** - www.blackdiamondequipment.com
- **Lyon Outdoor** - www.lyon.co.uk

11.2.4 Bears

- **Black Bears** - www.adfg.alaska.gov/static/education/wns/black_bear.pdf
- **Brown Bears** - www.adfg.alaska.gov/static/education/wns/brown_bear.pdf
- **Bear Safety** - www.udap.com

11.2.5 Maps

- **Alaska Map 1** - www.adventuresakrv.com/Images/MapsCalCharts/AlaskaMap.png
- **Alaska Map 2** - www.rusnet.nl/encyclo/a/alaska.shtml
- **Wrangell Area Map** - www.mytopo.com/maps/?mtlat=61.43540&mtlon=-143.25591

11.2.6 Kite Aerial Photography

- **Definition** - www.wikipedia.org/wiki/Kite_aerial_photography
- **General Techniques and Equipment**
 - www.gentles.info/KAP
 - arch.ced.berkeley.edu/kap/kapoc.html
 - www.kaper.us
- **Picavets**
 - www.gentles.info/KAP/PICAVET/experiment.htm
 - www.robohobby.com/picavet_suspension.jsp
- **Photographic Camera** - www.gopro.com/cameras/hd-hero-naked-camera

11.3 Books

- **The Avalanche Handbook**, David McClung, Peter Schaerer (The Mountaineers Books, 1993)
- **The Expedition Handbook** - Shane Winser (ed.) Profile Books, 2004. 502pp. ISBN I 86197 0447.
- **Far From Help Wilderness Medical Handbook**
- **The Avalanche Handbook** - David McClung, Peter Schaerer (The Mountaineers Books, 1993)
- **Medicine for Mountaineering** - James A. Wilkerson (The Mountaineers Books, 2001)
- **The High Altitude Medicine Handbook** - Andrew J. Pollard and David R. Murdoch (Radcliffe Publishing, 2003)

11.4 Previous Expeditions to Alaska

- **Expedition to Baldwin Glacier** - www.alpinedave.com/alaska/expedition_home.htm
- **Expedition to Mount Hope** - www.summitpost.org/alaska-10k-peaks/357094
- **Expedition to the Jefferies Glacier** - Barkley Ridge; Wrangell St Elias 2010 Expedition. MEF Ref: 10/09
BMC Ref: 10/19.

11.5 Previous IC expeditions

- 2009 IC Greenland Expedition
- 2010 IC Obra Valley Expedition
- 2011 IC Reru Valley Expedition
- 2011 IC Svalbard Expedition

11.6 Research Contacts

- Spike Reid - Kite Aerial Photography
- Stuart Howard and David Swinburne - Previous Alaska Expedition.
- Steven Gruhn - Alaska Unclimbed Peak Records
- Shane Winser
- Dr David Hillebrandt - Medical Consultant

Acknowledgements

We would like to thank those who have help organising and encouraging us to plan this expedition thus far. Lorraine Craig, Shane Winsler, Nick McWilliam, Simon Yates, Stuart Howard, IC 2011 Svalbard expedition, with a special mention to Nathaniel, IC 2010 Obra Valley Expedition specially to Jonny and IC 2011, Reru Valley Expedition.

Appendix A

Useful Contacts

Charter pilot: Paul Claus

e-mail: paulclaus.ak@gmail.com

www.farfagnargnar.com

Park Headquarters & Administration

The park administration building in Copper Center is open Monday-Friday, year-round from 8:00am - 4:30pm.

Wrangell-St. Elias Visitor Center

Mile 106.8 Richardson Highway, Copper Center, AK 99573

Phone: 907-822-7250

Park / Headquarters 907-822-5234

Superintendent: Meg Jensen

E-mail: wrst_interpretation@nps.gov

Chitina Ranger Station

Chitina, AK, located 1 hour from Park Headquarters

Phone: 907-823-2205

Kluane National Park

Superintendent Phone: 403-634-2251

Yakutat Ranger Station

PO Box 137

Yakutat, AK 99689

Appendix B

Safety Plan

B.1 Safety Plan

This safety plan has been prepared to ensure that all risks have been fully identified and understood, all reasonable measures to control these risks have been put in place and all remaining risk is as low as possible. Additionally, in the case of an accident, all required information is readily at hand.

B.1.1 Participants

Name	First Aid Trained	Mobile Number
Sara Arbos Torrent	To Complete Marlin Course	00 44 79690 13053
Boris Korzh	To Complete Marlin Course	00 44 79803 89368
Samuel Thompson	Yes	00 44 77126 67886
Arnaud Sors	To Complete Marlin Course	00 44 75632 65498

B.1.2 Emergency Services

Whilst travelling in:

- UK - 999
- USA - 911

B.1.3 Medical and Travel Insurance

British Mountaineering Council insurance will be obtained, specifically the High Altitude and Remote Areas policy.

This covers each person for up to (amounts in GBP):

Medical Emergency Expenses:	£10,000,000
Rescue/Recovery:	£100,000
Hospital Inconvenience Expenses:	£1,000
Personal Accident:	£10,000
Personal Liability:	£2,000,000
Personal Belongings (inc. cameras/watches):	£2,000
Cancellation:	£5,000
Delayed Departure:	£100
Missed Departure:	£500
Legal Expenses or advice:	£25,000
Curtailement of journey or trip:	£5,000
Catastrophe Cover:	£500
Personal Money:	£500
Loss of Passport:	£250
Hijack:	£1,000

B.1.4 Upon Arrival

Upon arrival in Alaska a detailed itinerary, insurance details and contact details will be left with the charter pilot and the park ranger at the Chitina Ranger Station.

B.1.5 Telephone Numbers

Imperial Sat Phone	TBC after purchase of SIM card
Medical contact - Prof. Chris Imray	TBC
Insurance BMC	00 44 20 7173 7933
Imperial College Security	00 44 20 7594 8910
Charter Pilot Sat Phone - Paul Claus	TBC
Ultima Thura Lodge messaging service	00 1 907 854 4500
Chitina Ranger Station	00 1 907 823 2205
Alaska Regional Hospital - 24 Emergency	00 1 907 264 1222

B.2 Incident response

Step 1: Initial response

- Are you safe?
- Think carefully: assess the situation, what you want to achieve, your immediate assets and limitations.
- Can you locate the casualty? If not, then find him (safely).
- Is the casualty conscious and able to move? If so, go to step 2a. Otherwise, step 2b.

Step 2A: Mobile Casualty

- You have assessed the situation; formulate a plan and act upon it.
- Discuss the plan with the casualty, but consider the extent of their injuries and factor this into how much they input.
- If separated from the other team members, consider whether you need them and their assets.
- Should you be unable to reach them via the radio, send out a distress signal by sounding six sharp blasts with a whistle. Repeat this every minute until you hear six whistle blasts in return.
- If you are unable to use a whistle, then send out six flashes every minute using a head torch.
- If you detect a return signal, continue sending out the distress signal so those responding can pinpoint your location.
- If it becomes dark try to use both a head torch and whistle as this will make it easier to pinpoint your location.
- If you receive no response, continue to send out the signal.
- Continue to assess the ability to get to your destination (ideally to base camp where satellite phone is held). Remember, a tired injured casualty can easily become an immobile or a dead casualty.

Step 2B: Immobile Casualty

- Don not try and be a hero, it requires real manpower to move an injured casualty.
- Stay where you are and apply all your efforts to keep the casualty alive. Should you be unable to reach them via the radio, sound six sharp blasts with a whistle. Repeat this every minute until you hear six whistle blasts in return.
- If you are unable to use a whistle, then send out six flashes every minute using a head torch.
- If you detect a return signal, continue sending out the signal so those responding can pinpoint your location.
- If it becomes dark try to use both a head torch and whistle as this will make it easier to pinpoint your location.
- Severe pain is not a reason to move a casualty to base camp under any circumstance. Give what pain relieving drugs are being carried in the personal first aid kits.
- Get the casualty:
 - Out of the wind and wet.
 - Apply first and advanced medical aid
- Use the casualty's equipment first.
- For a cold, wet casualty, if carrying sleeping bags, put casualty in their sleeping bag, then a bivvy bag, then your sleeping bag and another bivvy bag.
- The rest of the team will come.
- Continually assess the casualty and document on the chart in the first aid kit; this information will be very important once evacuated.

- Don not forget to keep your kit together, eat their chocolate, drink lots, and keep warm.

Step 2C: Actions on detecting a distress signal

- If you detect a distress signal it means one or more members of your team is in trouble. Acknowledge by returning six blasts of a whistle or six flashes of a torch, then return to base camp and pick up:
 - Tent
 - Sat phone
 - EPIRB
 - GPS
 - Snow shovel and saw
 - 6 food packs, stove, pans, and fuel
 - Medical kit
 - Climbing gear (plenty of screwgates), tape and abseil tat
 - Personal climbing equipment
 - Digital camera
- Get to the casualty/casualties and listen to their plan. Appoint one person to record information on the charts and to communicate to the casualty. Record BP, BPM, temperature, decisions made at what time and location as well as any drugs given. Keep the communicator out of the decision making loop to act as a filter.
- If the medical emergency is serious, call UK contact for medical advice.
- For the first 30 minutes work with the on-the-scene plan as is, and then develop from there. Do not assume or second guess.
- Remember that everyone involved with the initial incident is a potential casualty.

Step 3: Stable Situation

- Make a hot drink and start making some food.
- Form a plan, you have traveled from base camp to the casualty being aware that you may have to evacuate on a stretcher on the way back. Use that knowledge.
- Break the operation down into smaller bits. Communicate the plan and execute.
- Continually appraise the situation and develop the plan as required.
- Remember to work at half pace; exhaustion will only make the situation more difficult.

Step 4: Medical Assistance and Evacuation

- Document the following:
 - Name and satellite phone number
 - Position, latitude and longitude
 - Accident/illness description (e.g. frostbite)
 - Clinical description:
 - * Conscious level - AVPU
 - * Airway
 - * Breathing - respiration rate, depth
 - * Circulation - bleeding, skin colour, pulse
 - * Disability - obvious injuries

- Treatment given (e.g. splinting)
- Next course of action (e.g. relocating to base camp)
- Assistance required (e.g. evacuation, priority if more than one casualty)
- Additional information (e.g. weather, other relevant information)
- Establish casualty priority:
 - Priority 1A Immediate evacuation, if possible from accident area.
 - Priority 1B Immediate evacuation but can transfer from accident area (e.g. to camp).
 - Priority 2 Urgent evacuation.
 - Priority 3 Evacuation needed soon.
 - Priority 4 Evacuation needed, but not life threatening.
 - Priority 5 Evacuation not needed, advice required.
- Should evacuation be required, follow the evacuation procedure.

Step 5: Post incident

- Each team member will write a personal report.
- As a group, document the list of decisions made with approximate times and locations. Use the list to discuss how you felt prior to, during and after the incident.
- Complete Imperial College incident reporting form.
- If required, speak to UK contact to discuss incident.
- Any major incident will involve a full debriefing on return to London.
- Debrief to be led by Expedition Leader.

B.3 Evacuation Procedure

Step 1: Medical Advice

- If medical advice is required, call UK based Prof. Chris Imray (number to be confirmed)
- ACE Assistance medical emergency helpline: 00 44 20 7173 7933

Step 2A: Get in touch with charter pilot

- Call Paul Claus and brief on the situation:
 - Sat phone number: (to be confirmed)
- Include:
 - Assessment/diagnosis of casualty
 - Whether medical contact has been sought/consulted.
 - Casualty location
 - Your location
 - Action being taken (e.g. if casualty on hill, are they being evacuated to BC, treatment being administered)
 - Current weather conditions
 - Contact numbers of insurance company
- He will now coordinate the rescue

- If it is not possible to get in touch with the pilot, proceed to step 2B.

Step 2B: Call the Alaska State Troopers

- Call the Alaska State Troopers:
 - 911 or 112
- Include:
 - Assessment/diagnosis of casualty
 - Whether medical contact has been sought/consulted.
 - Casualty location
 - Your location
 - Action being taken (e.g. if casualty on hill, are they being evacuated to BC, treatment being administered)
 - Name and Sat Phone Number
 - Contact number of charter pilot
 - Contact numbers of insurance company
- State the nature of assistance that you require (doctor, search and rescue teams, etc).
- State that you have left your itinerary with the Park Ranger
- They will coordinate the rescue to be carried out by the Alaska Mountain Rescue Group

Step 3: Contact Insurance Company

- Call insurance company: (BMC Insurance) ACE Insurance: 00 44 20 7173 7933
- State intention to evacuate and brief insurance company on the situation, including:
 - Reason evacuation is necessary
 - Assessment/diagnosis of casualty
 - Whether medical contact has been sought/consulted.
- Provide contact details of Paul Claus (to be confirmed).

Step 4: Contact Imperial College

- Leave message with Imperial College Security, who will contact Dr. Lorraine Craig.
 - Telephone: 00 20 7594 8910
- Include:
 - Casualty location
 - Your location
 - Action being taken (e.g. if casualty on hill, are they being evacuated to BC, treatment being administered).
- If you have not spoken to insurers, instruct home contact to establish contact with and brief insurers.

Step 5: Standby

- Standby and await further instructions.
- Avoid unnecessary use of satellite phone to allow emergency services to contact you.
- Await help

Step 6: In the event of satellite phone failure

- **!! Do not follow these instructions unless you have tried and failed to contact all other contacts via the satellite phone. !!**
- Is the evacuation agreed by Sara and the rest of the team? If so: **Activate EPIRB.**
- Refer to evacuation plan and continue to attempt to establish contact through the steps. Continue until you establish contact.
- Await help. It will come.

Appendix C

Avalanche Safety

This appendix presents a summary of relevant knowledge and protocols related to avoiding and, in the unfortunate case, dealing with avalanches and appropriate rescue protocols. The major sources of information for the compilation can be found in the bibliography.

C.0.1 Prediction

Is the single most effective way of avoiding avalanches. The importance of this cannot be overstated, as burial by an avalanche would most probably result in death, even if professional search and rescue teams were available in the area. Since the team is going to be entirely self reliant this is the single most important factor in minimising the risk from avalanches. The most important factors related to avalanche hazard are:

1. Angle of slope: anywhere between 20° - 60° is prone to avalanches, 30° - 40° is generally the worst.
2. Profile: i.e. shape of slope; convex slopes are worse, because snow pack is in tension, and thus it is likely to crack, inducing failures. Additionally, contact surface beneath snow should be considered; slope stability worsens when moving from grass and scree to rock slabs (very bad).
3. Snow Modifying Processes, these include:
 - (a) Equitemperature (ET) metamorphism: Occurs when temperatures are below 0° . Decreases snow crystal sizes into rounded shapes. In the first instant this creates unstable powder snow. Later re-bonding can start leading to the formation of more stable firn, this may take a few hours - day.
 - (b) Thermal Gradient (TG) metamorphism: Happens in places with a high temperature gradient, for example grass to snow, or rock to snow interfaces. Destabilises those interfaces in a few days - few weeks time.
 - (c) Melt - Freeze (MF) metamorphism: When temperatures are varying from above to below freezing point multiple times, bonds between snow particles can consolidate until firn turns into neve; this stabilising process takes a few days.

Type	Type of Snow	Description	Affiliated type of Avalanche
A	Powder	Loose, unconsolidated. Forms when $T \leq 0^\circ$, no wind	Avalanches can occur when powder overlies more consolidated layers, i.e. spindrift avalanche in gullies; these can knock a climber over
B	Windslab	From fresh or redistributed snow; forms in wind; there is a characteristic squeaky noise when sticking axe into windslab	When such weakly bonded snow, most commonly wind deposited, detaches from surface below, while leaving a fracture line. Significantly stronger than A.
C	Firn	Well consolidated, older snow, ET has occurred	Generally stable.
D	Neve	Ideal for climbing, formed from firn by MF; it is firm enough to support climbers well but still allows easy penetration of ice tools	Generally stable
E	Snow Formations	Serac, cornice etc collapse	Often triggered by climbers. Impact on climber is significant. Can also trigger further A or B type avalanches.
F	Wet	When $T \geq 0^\circ$, wet, i.e. water droplets form when squeezed into snowball.	Comes down in big rubbles and blocks which can crush a climbers

C.0.2 Avoidance

1. Constantly check and re-evaluate conditions; beware of past weather history and watch out for signs of avalanche risk, such as:

- (a) Recent/current avalanches
 - (b) Whether they were natural or human triggered
 - (c) Heavy snow build up (i.e. more than 2cm/hour rate of deposition), especially if windy
 - (d) Highest risk is during and immediately after (i.e. 24-48hrs) storms
 - (e) Rain or warm temperatures
 - (f) Shooting cracks, 'whoomp' noises when walked upon
 - (g) Leeward slopes
 - (h) Dig test pits and do shear tests, as often as necessitated by changes in conditions, to gain further knowledge of underlying layers and identify overlying layers with significantly different properties.
2. Most of the time when the above are observed, the avalanche-prone slope can be avoided by choosing an alternative route or by retreating. Otherwise it is important to remember that, according to The Mountaineering Council of Scotland, 90% of avalanches involving humans are triggered by their victims. Thus, if it is essential to proceed, the following should be borne in mind:
- (a) No one should travel solo.
 - (b) Avoid areas of heavy snow build up; i.e. use ridges rather than faces; generally a direct descent or ascent is safer than traversing.
 - (c) Avalanche transceivers are suggested to be used in addition to carrying collapsible probes and shovels which play a crucial role in effective rescue.
 - (d) Go one at a time on any suspect slope - the others should closely observe the progress of the person on the slope.
 - (e) Close up clothing, wrap scarf or other item round mouth and nose. Belay if possible - this might be unfeasible on many wide, open slopes.

C.0.3 Survival Tactics

1. Delay the fall: 'The more goes before, the less is left to bury.' Try to move above or to the side of the fracture line.
2. Look, orientate yourself and shout: aim to move towards side of the avalanche; others might hear you.
3. Fight to Stay on Surface: once dragged away by the avalanche try to swim, ride, roll, surf, etc as staying on top gives the best chance for survival. Keep head up slope and shut mouth.
4. Try to get any part of the body above the surface: easier to be found by the others. If buried, take a deep breath, cover mouth and nose with one hand, while creating an air space with the other hand. Dig upwards - can determine direction by spitting - only if you know which way is up, or wait to be found by others.

C.0.4 Rescue

1. Watch where victim is driven rather than dash after victim. Establish observed burial point (OBP) and mark it once safety of the area is evaluated.
2. Dig ASAP, search narrow cone area under OBP with as many people as possible. Look for signs of victim and use transceivers, if available, to locate and probes to test and accurately determine position of victim.
3. First 15-30min, the victim has a good chance for survival. After 45min chances of survival are minimal BUT do still exist, hence search should go on for a few hours.
4. If victim is found, first clear mouth and nose from snow, free chest then proceed with first aid protocols; also assume some degree of hypothermia.

C.0.5 Equipment Recommended

1. Due to the very tight time frame in which a rescue can be effective, the use of appropriate equipment can decide the victim's chances of survival. Transceivers, although expensive, provide the single fastest way to locate buried victims; when appropriately operated by experienced users. Probes and shovels are necessary to ensure the exact location and a speedy excavation of the victim.

2. Shovels are also very useful for other tasks during the expedition, including digging emergency snow shelters or building protective snow walls around tents or bivouacs.
3. Below is a list of recommended equipment for a 4 man mountaineering expedition, in which light weight travel is essential. As the Exploration Committee already owns these items, due to purchases for previous expeditions.

C.0.6 Expedition Training

1. This section is only a summary of many relevant documents. During the months before the expedition the team will continue to read further material on the subject searching for any updates compared to the previous year's expedition, in order to keep up to date with the most relevant information on avalanche safety. This includes a further search for relevant Alaskan avalanche reports.
2. Since most skills associated with avalanche prediction and rescue, especially efficient usage of transceivers, can only be obtained by practice in the field, the team is planning to try out all related safety equipment and practice snow evaluation and rescue protocols during several trips, See section 8 .
3. The team also sees the expedition as being an opportunity to gain valuable mountain safety knowledge which can later be passed on not only to later expedition teams run through the Exploration Board, but also to relevant clubs and societies of the union, such as the Outdoor and Mountaineering clubs.

Appendix D

Lake Louise Self Assessment Scorecard

Each category is scored individually. A total score of 3 or more constitutes AMS. Repeated scoring is used to monitor progression of AMS.

Headache

- 0 No headache
- 1 Mild headache
- 2 Moderate headache
- 3 Severe headache, incapacitating

Gastrointestinal Symptoms

- 0 No symptoms
- 1 Poor appetite or nausea
- 2 Moderate nausea or vomiting
- 3 Severe nausea and vomiting, incapacitating

Fatigue and weakness

- 0 Not tired or weak
- 1 Mild fatigue/weakness
- 2 Moderate fatigue/weakness
- 3 Severe fatigue/weakness, incapacitating

Dizziness and light-headedness 0 Not dizzy

- 1 Mild dizziness
- 2 Moderate dizziness
- 3 Severe dizziness, incapacitating

Difficulty sleeping

- 0 Slept as well as usual
- 1 Did not sleep as well as usual
- 2 Woke many times, poor night's sleep
- 3 Could not sleep at all

Appendix E

Kite Aerial Photography

This appendix provides a more detailed explanation on Kite Aerial Photography, including a brief description of the equipment that will be used in the expedition

E.1 Parts and Manufacturing

Below there is a basic description of all the equipment needed. Note that the parts have been chosen such that they weight as little as possible so that the tool can be taken up our objective and obtain aerial photos on our summits. Note that the combination chosen will weight about 900g.

Kite

The most important aspect of any kite used to lift a camera is stability and high lift generation. Generally single lined kites are used as they allow very long line lengths and need less intervention from the flyer than steerable designs. The most used designs are parafoil, rokkaku and delta. Being the parafoil type the most popular as it has a higher lift to size ratio. Sparred kites such as the rokkaku or delta tend to fly at a higher angle than parafoils, which is of benefit when the space between the launch site and photographic subject is limited. A higher flying angle permits the kite to lift more weight, as is generates more lift.



Figure E.1: High lift Kite. *Premier Power Sled 14*.

We will be using a *Premier Power Sled 14*, see figure E.1 as it has been recommended by Spike Reid who successfully used in Svalbard. Its main characteristics are:

- Size: 160 × 102 cm
- Fabric: Riptop Nylon
- Wind Range: 6 – 20 mph

Picavet

A Picavet suspension, named after its French inventor Pierre Picavet, consists of a rigid cross suspended below the kite line from two points. A single line is threaded several times between the points of the cross and the points of attachment to the kite line and the rig is attached to the cross. The Picavet line runs through eye hooks or small pulleys so that the weight of the rig causes it to settle naturally into a level position. The dimensions and shape of the Picavet have been adapted many times in attempts to increase stability or to improve portability.

A light-weight High Definition Camera will be used. Go Pro Hero model has been chosen as it has specially been designed for Outdoor activities. Hence, having extra protection against possible crashes and cheap replacements of lenses and protection cases.

Appendix F

Equipment List

F.1 Clothing

Head covering
Down jacket
Mountaineering pants
Alpinism gloves (2-3 pairs)
Gore-Tex jacket
Gaiters
Sunglasses
Sun-protection

F.2 Tents and sleeping

Mountaineering tents
Sleeping pads
Down sleeping bags
Cooking supplies
Stoves and fuel/gas
Thermos
Knife

F.3 Mountaineering

Maps
Compasses and altimeter
GPS
First-aid kits
Skis / bindings
Skins
Boots
Poles
Crampons
Backpack
Helmet
Harness
Ropes
Cordelettes
Headlamp
Ice axes
Ice screws
Cams and nuts
Carabiners
Slings
Backpack
Glacier equipment (mini-trac)

Repair kit

F.4 Communications and Safety

Satellite Phone
Replacement battery
Emergency Beacon
Avalanche transceiver
Shovel
Probes

F.5 Other

Camera / batteries
Small portable solar panel / charger
Power Monkey
Pharmacy