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ALL MILITARY REPRESENTATIVES

CONCEPT FOR NATO LAND FORCES OPERATING IN COLD WEATHER CONDITIONS

Reference
A. SHAPE COS letter to DIMS, 1123/SHLOP/03/-98019, 16 April 03

1. SHAPE provided a "Concept for NATO Land Forces operating in cold weather conditions" enclosed to Reference A.

2. The aim of this document is to ensure that the required capabilities to operate in cold weather conditions are identified. It focuses on characteristics and effects of continental cold weather conditions.

3. This document identifies the specific continental cold climatic environment, the possible impact of those conditions on land forces operations and defines capabilities, training and evaluation requirements of indicated forces.

4. The IMSM is provided for your information.

J.P BANSARD
MG FRAR
AD L&R

for SIR PAUL HADDACKS
Vice Admiral, UKNA
Director
International Military Staff

Enclosure
1. Concept for NATO Land Forces operating in cold weather conditions, 16 April 03
Copy To SDLT (LESS MILREPS), P&P (7) (A BR, B BR, C BR(3), REGISTRY)
Action Officer: Lt. Col E. Deaki, P&P, (5699)

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1123/SHOPL/03 - 98019

TO: Director, International Military Staff

SUBJECT: CONCEPT FOR NATO LAND FORCES OPERATING IN COLD WEATHER CONDITIONS

DATE: 16 April 2003

REFERENCES:
A. MC 317/1 The NATO Force Structure, 24 Jul 2001
B. SACEUR's letter to DIMS on the Future of the NCF, 10 Jul 2002
C. MCM-104-02, 30 Jul 2002
D. IMSM-584-02, 26 Sep 2002

1. Reference A identifies the requirement for graduated readiness forces (GRF) capable of deploying within or beyond Alliance territory. Much of the area in which NATO forces could be expected to operate is subject to continental cold weather.

2. References B, C and D noted that the NATO Composite Force (NCF) was no longer required, and the Force and its associated Concept were cancelled. However, the requirement remains for the deployable high readiness forces of the NFS to be able to conduct operations across the whole mission spectrum, including under continental cold weather conditions; SACEUR therefore proposed to capture the experiences gained through the NCF, and to develop a cold weather concept for future NATO Land Forces.

3. The aim of this new concept is to close the conceptual and doctrinal gap and provide more clarification to the Nations and the NATO GRF(L) HQs on the capabilities required to operate in continental cold weather conditions. It does not provide definitive guidance, nor does it address the highly specialised capabilities required by forces operating in extreme cold weather conditions.

4. DIMS is invited to forward the enclosed document for notation by the MC.

FOR THE SUPREME ALLIED COMMANDER, EUROPE:

Roberto Cesaretti
Vice Admiral, IT N
Acting Chief of Staff

ENCLOSURE:

1. CONCEPT FOR NATO LAND FORCES OPERATING IN COLD WEATHER CONDITIONS

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CONCEPT FOR NATO LAND FORCES OPERATING IN COLD WEATHER CONDITIONS

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References

A. MC 317/1, The NATO Force Structure, 08 Jul 02

B. MC 400/2 (Final), MC Guidance for the Implementation Of Alliance Strategy, 23 May 00

C. ATP 3.2 Land Operations

D. United States Air Force Worldwide Climatic Extremes and Percentile Reference, Version 10, Oct 97

E. MC 458, NATO Training, Exercise and Evaluation Policy, 21 Aug 01

F. 3430/CJPLO/00, SACEUR COP 10403 FRONTIER GUARDIAN, Mar 00

G. C-M (99) 21 "The Alliance's Strategic Concept"

H. STANAG 2895 Extreme climatic conditions and derived conditions for use in defining design/test criteria for NATO forces materiel, Feb 90.

I. 1100.3/SHOPA/94ACE Forces Standards Volume II Standards for Land Forces 01 Oct 94

J. MC 299/7 (working paper-2) MC Guidance to 2004 Force Goal Cycle

K. Force Proposal (FP) 0048

L. 2100/SHPRX/02/02, The 2003 Defence Requirements Review (03 DRR) planning situations

Chapter I – Introduction

General

1. The background for this concept is the decision to cancel the NATO Composite Force (NCF) and its associated concept.

2. Individuals and units must always take precautions against the special conditions caused by weather. This is especially true for winter conditions with low temperatures, snow, wind, darkness, humidity, mist and rain. Units need to survive and be capable to conduct operations in such environment. This can only be achieved by gaining experiences through training and exercising under such conditions.

3. Ref K constitutes, that "deployable high readiness forces, as a whole, must be capable of deploying within or beyond Alliance territory. A large portion of the areas within and beyond Alliance territory where a significant portion of NATO forces could be expected to operate, experiences either continental cold or extreme hot desert weather. For some operations, this requirement demands specialised clothing, equipment, training, preventive medical measures, infrastructure and geographic support". This documents is focussed on continental cold weather conditions.

4. Although all military personnel and units need to be trained to operate and sustain in cold weather conditions, only a limited number of units would be required for operations under extreme cold weather.

5. This document is focussed on land forces.

Aim

6. The aim of this concept is to ensure that the required capabilities to operate in cold weather conditions are identified. In support of that aim, the lessons learned from the execution of the NCF Concept were captured.

7. Identified operational requirements for forces are to be translated into measurable force standards in order to facilitate training and evaluation and thus ensuring that these capabilities are maintained in the NATO Force Structure.

8. This document may also assist Force Planners to validate the requirements derived from FP 0048 and measure those against capabilities identified by this concept. Any capability gap will have to be translated into a specific requirement for a specific number of units.

9. The aim of this document is not to provide prescriptive guidance nor will it go into the required detail for highly specialised forces operating in extreme cold weather conditions.

Scope

10. This document:
– Identifies the specific continental cold climatic environment.

- Identifies the possible impact of those conditions on land forces operations.
- Defines required capabilities of indicated forces.
- Can be translated into measurable Force Standards and thus identify training and evaluation requirements.

Chapter II –Characteristics and effects of continental Cold Weather Conditions

General

1. The coldest regions are the Arctic and Antarctic. The Antarctic region is not of immediate concern to NATO. The Arctic region includes areas of Northern Siberia, Northern Canada and Alaska. No employment of NATO forces is envisaged in Arctic regions.

2. The region including Alaska, Canada, northern Iceland, and the most northern parts of Norway, Sweden and Finland are facing extreme cold weather conditions. According to FP0048 significant numbers of NATO forces are unlikely to be deployed in these areas as Force planners assess sufficient numbers of specialized forces to be available to cover a possible requirement.

3. The continental region is the area where most likely NATO forces may be employed in cold weather. In Europe, the continental climate occurs in eastern and northern Norway, most of Sweden and Finland, western Russia, most of the Ukraine, the Baltic States, Belarus, Poland, the Czech Republic, Hungary, much of the Balkans, Romania, Bulgaria, Moldavia, and Slovakia. Additionally, in accordance with DRR 03 Planning Situations NATO force deployment may also be required to Eastern- and South-eastern Turkey as well as to Central Asia and Transcaucasus.

Characteristics of Cold Weather Environments

4. Continental cold climate is characterised by snow cover, low temperatures (in general near the freezing mark but also as low as –20 degree Celsius for periods up to 10 days in total and could reach –32 in extreme cases), snow/precipitation and wind, individually or in combination. [1]

5. Temperatures during the winter months in continental climates are at or near the freezing mark most of the time. However, the temperature can reach levels below -20°C, in extreme cases -30°C occurs. Temperatures near -20°C require clothing beyond the normal issue and require also special care for vehicles, weapons and other equipment. For details see ANNEX A.

6. Forces operating under continental cold weather conditions should be capable of conducting effectively all types of operations. The execution of operations under these circumstances will be exceptionally difficult, and depending on the specific conditions, the tempo and speed of the operation could be severely affected. To achieve this, they need specific and extensive training in these conditions.

Continental cold weather effect on the human body

7. Certain combinations of wind and cold temperature (high wind-chill factor) can cause frostbite. Specific protection measures focused on extremities of soldiers can be found.

[1] MCM-001-2002, enclosure 2 to Annex A: Force proposal 0048 (Reference K)

8. The greatest challenge is the heat regulation, basically to avoid body overheating. Therefore, for the individuals it is paramount to know how to vary the use of clothes pending on the activity. Details about clothing are listed at ANNEX B.

Some effects of continental cold weather on operations

9. This non-exhaustive list depicts the effects that can be countered by specific equipment and/or training.

- Snowstorms and whiteouts may result in disorientation. Movement may become difficult and dangerous.

- The snow reduces the mobility of wheeled vehicles and personnel on foot.

- In mountainous areas, strong and stable winds, combined with heavy snowfalls and changes in temperature, create a high risk of avalanche.

- Snow blindness is (near) blindness for a time, caused by continuously looking at snow in bright sunlight.

- Winter conditions with frozen ground and lakes could significantly increase units mobility, as this would provide possible axes of advance if the necessary vehicles or equipment would be available.

- All types of batteries are sensitive to low temperatures and when cooled, will lose a great part of their capacity.

- Blockage of weapons barrels by snow and/or ice during firing may cause the barrel to break, damaging the weapon and injuring personnel.

- Moving weapons in and out of warm locations might result in condensation that might freeze, thus affecting mobile parts and optical sights. High rates of fire will also cause problems with freezing of condensation, particularly weapons firing from a closed bolt.

Chapter III – Required Capabilities of Forces

General

1. NATO used to train the NCF based on a specific requirement. When this requirement was no longer valid, the decision was taken to close down the NCF. At the same time NATO is expanding and operating in regions where weather conditions close to those faced by the NCF are normal.

2. Two aspects have to be taken into consideration for the continental cold weather capability of NATO deployable forces. The first one is defining what generic capabilities (equipment and training) are required to be able to operate in continental cold weather (validate the rationale for FP 0048). The next one, much more challenging, is to define through the Defence Requirement Review process (DRR) the exact number of forces that have to meet the stated capabilities (validate FP 0048).

3. In order to allow such a study, SHAPE based the analysis on the Essential Operational Capabilities (EOC). Although these EOC will always remain essential, whatever the weather condition may be, only those EOC that might directly be affected by continental cold weather conditions were examined.

4. Finally, based on the lessons learned from the NCF and other experiences gained during winter exercises, some required capabilities would be identified to reduce the adverse effect of weather conditions on the EOC.

Deployability and Mobility

5. Although frozen and snow-covered lakes, rivers and swampy areas may look suitable for tactical manoeuvre, a risk remains. In mountainous areas changes in temperature create a high risk of avalanches – specifically dangerous for infantry using "good" infiltration possibilities.

6. Mobility will be impeded by snow and cold weather. Essential snow clearing equipment must be readily available and planning must include time for necessary snow clearing of essential areas such as firing positions and HQ locations.

7. Manoeuvre and support units must be equipped and trained to use oversnow vehicles. It is essential that the tracked vehicles are adaptable for the use in snow and on ice. All wheeled vehicles should be equipped with snow and ice chains. For detail see ANNEX B.

8. Dismounted troops require specific training and equipment to retain limited mobility.

Command, control and communication

9. To exercise C2 authority during NATO operations in continental cold weather conditions, commanders will use the NATO Communications and Information System (CIS). Extreme cold environment degrades the capability of the CIS.

10. The cold might effect exposed radio equipment both by reducing the efficiency of certain components and by making operating conditions particularly difficult. To establish a ski or snowmobile equipped messenger system might be essential to avoid the communication system at the tactical level to cut off.

Logistic sustainability

11. Although the logistic system as such does not have to change, operations in continental cold weather conditions require specific planning data. These weather conditions might call for specific storage (water), just in time delivery for items, particularly sensitive or, bigger stocks for specific winter items (fuel for heaters). Furthermore, the human body needs more energy for work in cold weather and the result of deficient nourishment is much more serious at low temperatures. For details see ANNEX C. The medical care gets another dimension in continental cold weather conditions. The following list is non-exhaustive:

- The basic winter equipment such as specific clothing and man carried equipment should be at the base locations.

- Specific equipment such as snow clearing vehicles. Oversnow capable vehicles can be stockpiled in the area of debarkation.

- Equipment and supplies have to be constructed and/or modified to operate properly in continental cold weather conditions.

- Suitable transport and storage facilities are required for equipment that cannot be exposed to freezing.

- Some high demand petroleum products for lighting, heating and for equipment and weapon systems will be required in larger numbers.

- Cold weather conditions create great challenges to medical treatment and evacuation. For details see ANNEX D.

- Medical installations with proper heating systems and insulation against cold from the ground to be set up close to the action.

- To avoid snow blindness appropriate eye cover has to be issued to all individuals.

Survivability and Force protection

12. Little, if any, digging into the ground will be possible by normal methods. Explosive digging and/or use of heavy engineer equipment may be required. The necessary equipment will have to be made available.

13. Snow conditions create special camouflage requirements, in terms of both colour and heat. White nets for vehicles, weapons, tents and other equipment and installations must be available. They should not react on heat sensors.

NBC

14. Most but not all Biological and Chemical agents are ineffective in extreme cold, so the cold could serve as a force protection measure against some types of biological and chemical weapons, certainly not against effects of nuclear weapons.

15. Some of the NBC detection equipment does not work satisfactorily in a continental cold climate. Properly operating equipment for continental cold conditions is required.

16. The use water for decontamination may be difficult during low temperatures. Hot water or steam might be required. To prevent the decontamination equipment from freezing at the end or during breaks of decontamination operations, it must be carefully drained or refilled with anti-freeze liquids.

17. Atropine injectors will freeze in temperatures below -3°C. The injectors have to be kept warm by the individual soldier by wearing them on the inside of the clothing during cold weather operations.

Chapter IV – Training and Evaluation requirements

General

1. Maintaining the combat efficiency of the unit is essential. First and foremost, personnel have to be trained to make adjustments and to take care of themselves in the cold conditions. This can be achieved only through respective training and exercises.

2. In the "ACE Forces Standards Volume II – Land Forces[2]" and in the Allied Tactical Publication ATP 3.2. "Land Operation" NATO defines the standards for the units of the Graduated Readiness Forces (GRF) Land (L).

3. SCs have to identify the specific continental cold weather training requirements and define training standards for specific units. The selection of the training methodologies to meet the standards however remains a national responsibility.

Training audience

4. In order to be effective, all units will require a certain degree of winter warfare training. This training will vary according to the readiness status category, the tasks and function of the unit. It is of utmost importance that all personnel undergo specific winter training, the units need to be trained as an entity.

5. High Readiness Forces (HRF), the NATO Response Force (NRF) and the Initial Entry Capable Forces (IECF) must also comprise of suitable units for operations under continental cold weather conditions, in order to meet the full spectrum of Alliance missions. Given the high readiness status category, the units required to operate under continental cold weather conditions should conduct training on a regular basis to maintain and improve that specific capability.

6. Forces of Lower Readiness (FLR) should develop a certain degree of expertise by identifying units to undergo winter training.

Training requirements

7. The training requirements do not dramatically change and should aim at the ability to survive in continental cold weather conditions and to carry out operations as required.

8. Specific, individual and small unit winter warfare skills can be found in ANNEX E.

9. Continental cold weather training should be finalised with an integrated exercise in order to assess the training level and capability of the units to operate under continental cold weather conditions.

10. Evaluation will help Commanders to identify shortfalls in training and/or equipment inadequacies.

[2] Currently under revision

11. Lessons learned gained during evaluations, exercises and/or operations have to be followed by the appropriate remedial action in order to improve operational capabilities.

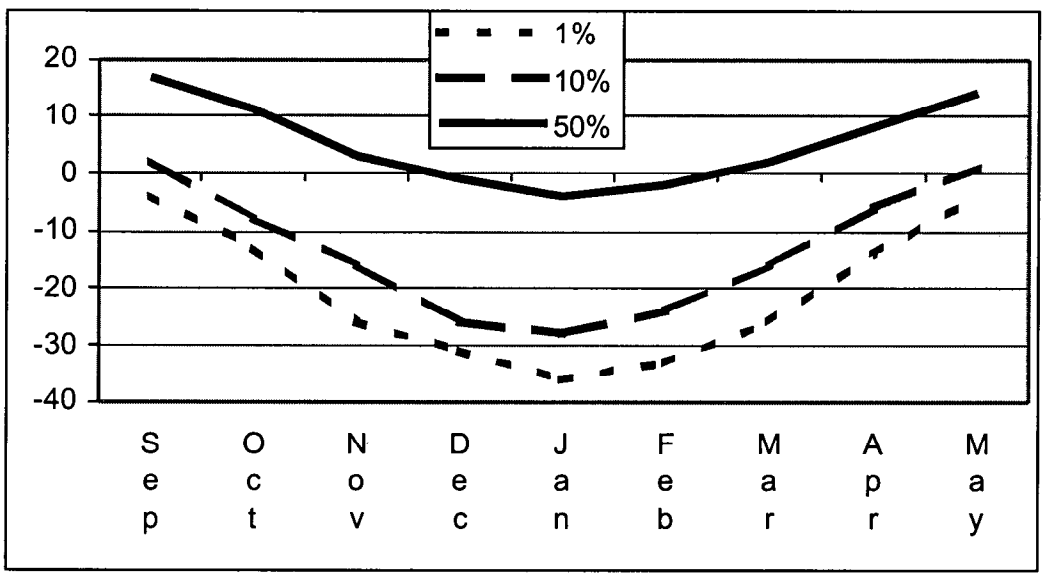
Annexes

A. Categorization of the cold geographical environment
B. Special equipment and clothing
C. Food and the fluid balance
D. Medical treatment and evacuation
E. Individual and small unit skills for continental cold conditions

ANNEX A

Categorization of the cold geographical environment

Minimum Temperature Profile for Continental Climates



1. This figure illustrates the temperatures ranges that can be expected under Continental Climate. The left-hand scale is in degrees Celsius and the lines represent the percentage of time the temperature is at or below the indicated value.

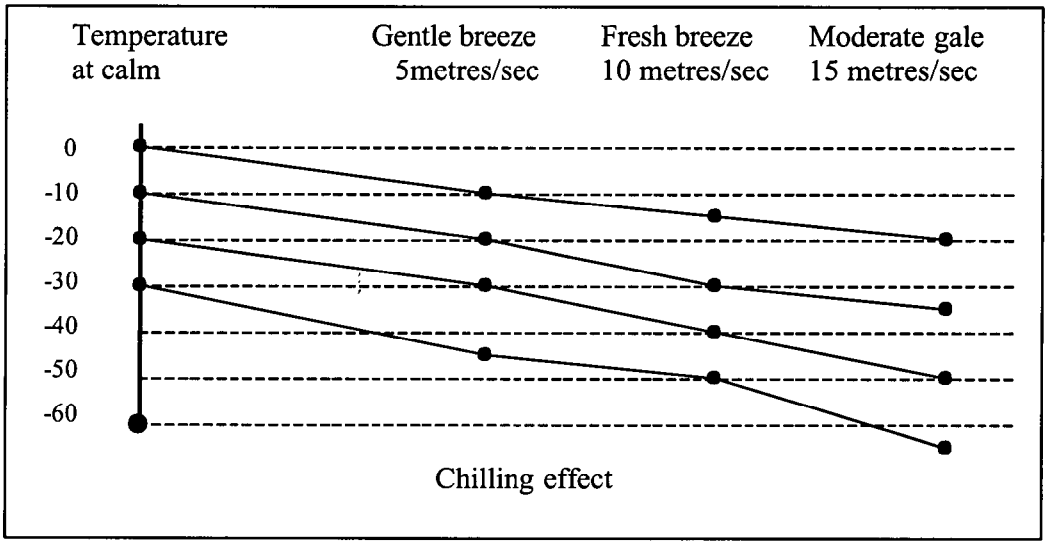
2. NATO STANAG 2895 (Ref. H) uses a different approach for the categorization of the cold geographical environment. This classification is based on air temperature, relative humidity and solar radiation. Table below comprises the mentioned categories. However, cold climate might also be characterised by snow cover, low temperatures, humidity and wind, all of these individually or in combination. These factors can create extreme situations for units/formations operating in areas with C0-C2 whether conditions.

Cycle	Meteorological		Area
	Temperature (C)	Rel Humidity (%)	
C0	-19 to -6	tending to saturation	Coastal areas of Europe, Southeast Australia and the lowlands of New Zealand.
C1	-32 to -21	--"--	Central Europe, Japan and central USA.
C2	-46 to -37	--"--	Northern Norway, prairie province of Canada, Tibet and much of the (former) USSR.
C3	-51	--"--	Coldest areas of north America.
C4	-57	--"--	Coldest areas of Greenland and Siberia.

C0: mild Cold
C1: Intermediate Cold
C2: Cold
C3: Severe Cold
C4: Extreme Cold.

Wind-chill factor

3. During certain combinations of wind and cold conditions (high wind-chill factor), the risk of frostbite could be the major threat for Land Forces. The table below shows how the wind velocity will influence the chilling effect.



ANNEX B

Special equipment and clothing

The following special equipment will be vital for successful winter operations by providing mobility and survivability during winter conditions:

- Skis and/or snowshoes are essential to the mobility of non-armoured or non-mechanised manoeuvre units.

- Ski or snowshoe mobile light infantry and reconnaissance units will require sleighs to improve their mobility and increase their capacity to deploy support weapons, ammunition and other vital equipment off the axis and away from the line of march.

- All non-armoured units, which are required by their operational task or support/logistic function to manoeuvre away from snow, cleared roads and echelon areas, should be equipped with or reinforced by over snow vehicles. Other vehicles will need to be adapted to the specific conditions.

- The mobility of tanks and armoured personnel carriers (APCs), armoured infantry fighting vehicles (AIFVs) and armoured combat vehicles (ACVs) will be hampered during extreme deep snow operations. Tracked vehicles will, by being equipped with specially designed snow grips, improve their deep snow capability. Wheeled APCs, AIFVs and ACVs have to be equipped with snow-chains.

- Snow removal capacity must be available. Bulldozers and wheel loaders equipped with snow removal devices like snow blowers, snowploughs and special designed snow buckets, are needed. Engineer equipment such as graders, normally equipped bulldozers, tractors and wheel loaders will have a limited snow removal capability. Non-tracked equipment must have snow or ice chains available.

- The individual soldier must be issued with uniform clothing appropriate for winter conditions. Normal field clothing for temperate conditions may be suitable, provided additional items are available including:

  + Fur lined cap;

  + Headover (polo neck);

  + Woollen sweater;

  + Field shirt;

  + Long underwear;

  + Over boots or mukluks (alternatively toe caps);

  + Socks (wool/polyamide/terry);

+ Wool mittens and mitten shells;

+ White camouflage suit;

+ Snow goggles;

+ Waterproof jacket and trousers.

– Light terrain vehicle (LTV) clothing comprises the necessary protection equipment for personnel using the vehicles daily. The items included in the LTV clothing are:

+ Thick felt socks;

+ Insoles made from the ground sheet;

+ Snowmobile gloves;

+ LTV helmet.

ANNEX C

Food and fluid balance

1. Food in winter does not significantly differ from summer food, except in the amount of daily calories required. The need for calories is relatively high in a cold climate (6,000-8,000 kilocalories or 24,000-32,800 kilojoules/man/day).

2. In combat, standard food and feeding procedures should, if possible, be maintained, with dinner served ready-made and hot. Dry food should be suitably portioned out to the various sub-units.

3. The dinner should have a temperature of 60° C when served up. This means that the unit commander must decide when to drive out the food in order to ensure hot meal for his unit.

4. Large fluid losses without subsequent supply of drink will dehydrate the body. In the first place this means a dramatic reduction in physical performance. For example, a loss of 4 per cent (3 litres of fluid for a 70-kilo soldier) will mean a 40 per cent drop in performance. If the fluid loss is greater, for instance 8 – 10 per cent of the body weight, the condition may become life threatening.

5. A combination of dehydration and cold can be dangerous because dehydration then leads to a reduced blood supply to the body. There may be a quick change from overheating to cooling, and the danger of shock becomes acute.

6. Only a steady and sufficient supply of fluids can re-establish the fluid balance in the body. In cold weather all drinks taken should be hot, which will prevent unnecessary heat loss. Coffee and tea have a stimulating effect. However, with physical exertion we should be aware of the fact that such drinks also dehydrate and therefore do not provide what normally corresponds to an increased fluid supply. On a ski march, for example, units should avoid drinking coffee and tea.

ANNEX D

Medical treatment and evacuation

From a medical view, the logistic implications include provisions for:

- Proper cold environment focused First Aid training for all individuals to increase self survivability;
- Proper clothing;
- Warm food and drink;
- Casualty bags for the protection of wounded;
- Special type cover (to retain body heath) to be issued to every individual;
- Medical installations with proper heating systems and insulation against cold from the ground;
- Heated facilities for medical stocks including during transport;
- Heated ambulances or other transportation means with tracks and/or nailed winter tyres;
- Care with heating of medical items.

ANNEX E

Required individual and small unit skills for cold conditions

Skiing (snow shoes):
- Ski with pack and rifle, using the Nordic cross-country skiing principles;
- Conduct the 10 km race for civilian ski badge in 60 minutes or less;
- Complete the 30 km race for the military ski badge;
- Use snowshoes.

Bivouacs:
- Establish good bivouacs using tents, snow caves or other improvised bivouacs, below and above the tree line;
- Bivouac routines must be carried out with greatest care if the individual's combat efficiency is to be maintained;
- Military personnel must be trained to master unforeseen critical situations and have to manage it without any bivouac equipment.

Engineer tasks and fieldwork:
- Use mines and obstacles in deep snow.

Transportation:
- Drive, protect and maintain vehicles in cold weather;
- Use special equipments to improve mobility of wheeled and tracked vehicles.

Survival and medical aspects:
- Survive under cold weather conditions using the specific military equipment;
- Know the symptoms of snow-blindness, frostbite hypothermia and carbon monoxide poisoning, and employ the correct first-aid measures as well as basic hygiene routines.

Weapons:
- Know, use and maintain all individual and basic collective weapons in general under cold conditions.

After having completed the collective training (tactical/technical) under cold weather conditions the participating units/formations are required to have the following skills:
Tactical:
- Execute small unit operations; such as tactical movement, recce and combat patrols, platoon/company attacks.

Technical:
- Organise and execute SAR operations;
- Organise and execute maintenance of weapons and vehicles;
- Organise and execute resupply of the units.