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www.cmi-logistics.com  
cml@cmi-logistics.com

# A problem of Vertical Manoeuvre



*Brigadier (Retired) Janez KAVAR,  
Slovenian Organization of Mountain Soldiers*



*Captain Matija PERKO,  
Slovenian Armed Forces, 15th Helicopter Battalion*

# Goals of Presentation

- To present practical military high altitude physiology problem
- To inject additional scientifically study of high altitude physiology problem to increase soldier's security in modern military operations
- To inject awareness of high altitude physiology problem within Slovenian Armed Forces



# Contents

- (Slovenian) military historical experience of high altitude physiology problem
- Early military awareness on high altitude physiology problem
- Mountain warfare – basic principles
- Vertical manoeuvre – use of helicopters
- Knowledge and awareness of high altitude physiological problems
- Conclusion



# Sgt Kekec died on K-2



Slovenian Military Alpine Instructor Sgt Boštjan KEKEC, member of national civilian "*Slovenian Caracorum Expedition 1992*", died on K-2 (8611 m), reason of death: Pulmonary Oedema!



# ISAF Afghanistan (3071m)



In February 2005, SAF soldiers in ISAF (Afghanistan) executed SAR operation on altitude of 3071 m. Because of fast helicopter transport, with no acclimatization, they reported on physiological problems.

# Clausewitz: Vom Krieg



Carl von Clausewitz  
(1780 – 1831)

Clausewitz analyzed geographical (relief, weather) impact on warfare and indirect impact on human body and necessary physiological qualities and skillfulness<sup>1</sup> of soldiers to survive and fight at mountain areas.

[1] acquired skills for movement in high mountain environment (climbing), movement in deep snow and skiing, assessment of (in)security passages of snow avalanche areas, very limited supply of water, etc.



# Military uplanders



A characteristic of mountain units in all countries in the initial period was that mountain units recruited soldiers among the population in mountain areas of individual countries with the innate and acquired psychological skills for life (survival), and warfare at high mountains in the world of extreme winter conditions.

The effectiveness and ability of military uplanders was plentifully demonstrated during the World War I, when the front lines led near 4000 m elevation (Ortler, 3902 m).

# Early military physiological investigations



Dr. Julius Kugy (1858 – 1944), Alpine referee during WWI, recognized and researched high altitude influence on human performance and wrote on it (*Divine smile of Monte Rosa*).



# From Ortler (year 1915) to Siachen Glacier (year 2009)

Thurwieserspitze, 3652 m



Ortler (3902 m)  
mountain range  
(3652 – 3431 m)



Siachen Glacier (5000  
– 7500 m), Himalaya  
mountain range,  
Indian – Pakistan  
border

# Basic principles of Mountain Warfare



- Limited maneuver
- Canalized movements
- Efficiency of small units
- Altitude dominant points
- Effectiveness of weapons with high curve of launching missiles
- Demanding logistical support
- la.
- **New: “vertical manoeuvre”!**



# Use of helicopters at mountain warfare – “vertical manoeuvre”



Helicopters have been used in warfare since after the World War II. In warfare in mountain areas increased use of helicopters occurred during the Soviet intervention in Afghanistan (1979 - 1989).

In the recent time operation "Anaconda" is considered the most extensive military operation in mountain world operation.



# Operation “Anaconda”



Shak – I – Kot – Valley, Tora Bora mountain range (2400 – 3600 m), March 2 – 17, 2005)

Gardez US Military Base  
(2000 m)



2000 soldiers, US 10th Mountain Division and 101st Airborne Division

Casualties: 18 killed, 182 wounded (cca. 10 %!)

# Knowledge and awareness of high altitude physiological problems



Knowledge and awareness of physiological particularities of the implementation of military operations at altitudes above 2000 m is particularly topical in modern times for a number of reasons.

The former principle of recruiting soldiers of mountain units in mountainous areas because of their high altitude living areas is no longer in use due to the decrease of conscript armies.

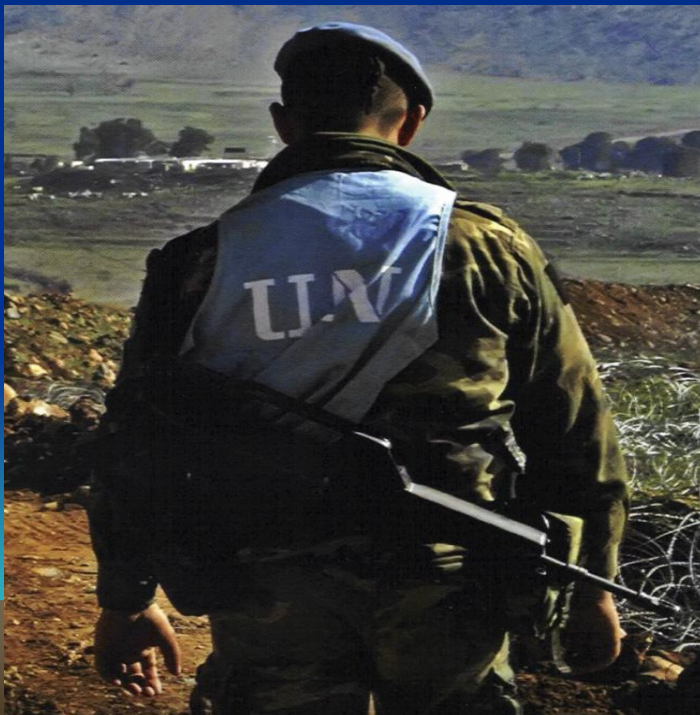
Modern professional armies recruit soldiers of mountain units without innate physiological abilities to operate at high altitudes of present physiological problems.

# Modern engagement in crisis operations



*Peace keeping is not  
Soldier's job,  
but only they can do it!*

*Boutros – Boutros GHALI,  
Former UN Secretary General*



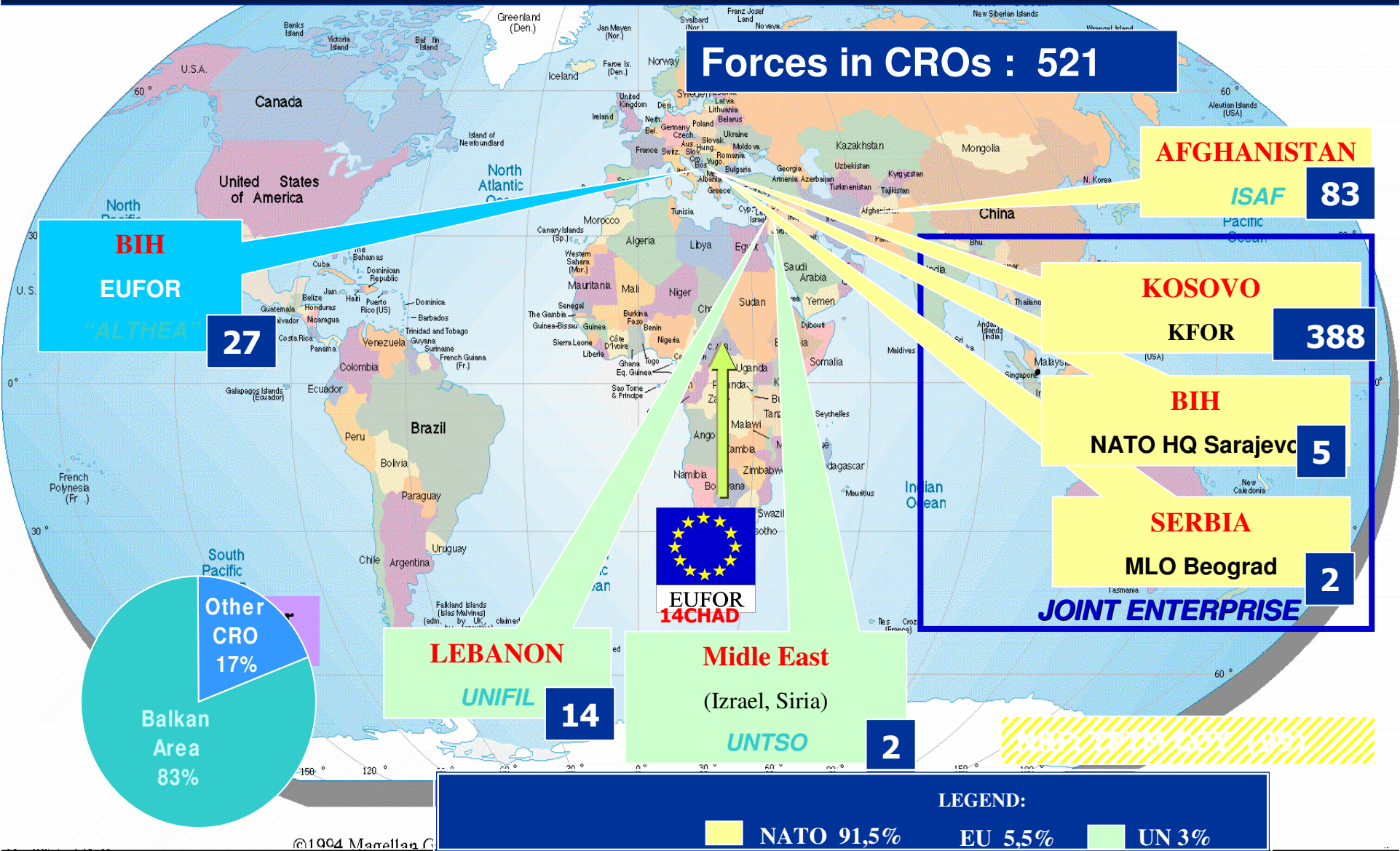
Engagement of military units in crisis operations (humanitarian and peacekeeping) is geographically unpredictable.

The current and potential future conflict zones of today's World are often located in the mountainous environment (Afghanistan, Pakistan, Caucasus...) with present of high altitude influence on human performance.

The modern CROs "operation techniques" (tactics) are basis on "quick response": mass use of helicopters with all "vertical manoeuvre" impacts...



# Forces in CROs : 521



The use of “vertical manoeuvre” in the principles of modern warfare at mountain areas accentuates the physiological problem of soldiers!





# Message to Military Commanders: **The higher the altitude, the greater the effects!**



Denali – Mt. Mc Kinley  
(6195 m) May 2005 –  
1st Slovenian Armed  
Forces High Mountains  
Expedition





Questions ?



***Slovenian Organization  
of Mountain Soldiers***



***Slovenian Armed Forces,  
15th Helicopter Battalion***

**Thank you for your attention!**