INTERNATIONAL MOUNTAIN TROOPS SUMMIT

MODERN WARFARE IN EXTREME COLD ENVIRONMENTS

This session brought together **Julia TASSE (IRIS), Colonel Gaétan DUBOIS (Commander of the French High Mountain Military School), and Captain JAMES (Royal Marines Commandos)** to analyse the challenges of combat in extreme cold environments.

The speakers emphasized the **primacy of individual training in coping with cold constraints**, with the **French model focusing primarily on specialized units**. **Climate change is altering Arctic operational theatres**, requiring **adapted tactics and equipment**. **Interoperability within NATO**, strengthened by **the integration of Sweden and Finland**, remains a key challenge.

- Julia TASSE: Introduction and the Challenges of Climate Change

Julia TASSE opened the session by thanking the organisers for their invitation, introducing herself as a **research director at IRIS (Institute for International and Strategic Relations)**. She specified that she **leads research on environmental, energy, and maritime issues** and heads a **research project for the French Ministry of the Armed Forces on the impact of climate change on defence**.

She emphasised that **climate change is already profoundly transforming operational theatres in polar regions**, with **increased temperature variability, more frequent extreme weather events, and ice melt**. These changes, combined with **strategic dynamics in the Arctic**, present **new challenges for the armed forces**.

- Colonel Gaëtan DUBOIS: Tactical Challenges and Military Adaptations

Colonel Gaétan DUBOIS, commander of the **French High Mountain Military School (EMHM)**, presented the **central role of his institution within the 27th Mountain Infantry Brigade**, based in **Chamonix and Modane**. He emphasized that **EMHM is the centre of excellence for the French Armed Forces in mountain and extreme cold operations**.

He highlighted that combat in extreme cold presents severe constraints**,** affecting operational capacity even before engaging with the enemy**.** Cold, snow, and harsh climatic conditions degrade the performance of equipment, maneuvers, and personnel**,** making specialized training, rigorous preparation, and adapted equipment essential**.**

As part of modern warfare in extreme cold environments**,** Colonel DUBOIS also pointed out the tactical dilemma **in** which the increasing use of surveillance, targeting, and deep-strike capabilities forces tactical units to disperse**,** while grouping them, even temporarily, helps sustain operations in extreme cold**.** The integration of multi-sensor intelligence, C4ISR, and artificial intelligence**,** as seen in modern conflicts, is altering the readability of the battlefield and applies directly to cold-weather warfare. However, he noted that some technologies, such as drones, experience a significant decline in performance when temperatures drop for extended periods**,** as observed in Ukraine, where their use **is** limited in winter**.**

Regarding military engagement in polar environments, he stressed that Sweden and Finland's accession to NATO has significantly expanded France's potential engagement zone in extreme cold conditions, within a strategic solidarity framework. This strategic expansion requires enhanced cooperation with joint-force partners and adaptation of force projection capabilities.

Finally, he insisted on the importance of **training and preparation.** France has chosen to integrate cold-weather warfare expertise into individual winter mountain training for every soldier **and across** all levels of specialised units. This individual acclimatisation to extreme conditions **is reinforced by** garrison-based training and continuous exchanges with Arctic allies **such as** Canada, Norway, Finland, and Sweden. **These** cooperative efforts, **along with participation in** multinational exercises like Nordic Response, **ensure** crucial interoperability for operational engagements.

Furthermore, with the current deployments of the French Army and joint-support forces on NATO's eastern flank, **particularly in** winter conditions, cold-weather operations are not limited to specialised units. **To ensure that** all French forces can operate in severe winter conditions, **as they may encounter in** continental Europe, **the** EMHM also disseminates general cold-weather warfare expertise to all military branches **through various** training programmes open to all units.

- Captain James: The Royal Marines' Experience in Polar Warfare

Captain James, Mountain Leader in the Royal Marines Commandos, shared insights from Arctic operations, noting that his unit spends three to four months per year in Norway training for extreme conditions.

He highlighted a key lesson from these deployments: investing in the individual outweighs reliance on technology. In his view, training and soldier resilience are critical to operational success. While new technologies, such as ISR sensors, advanced optics, and communication systems, play an important role, they cannot replace the adaptability and self-sufficiency of soldiers in hostile environments.

Climate change is directly impacting operational conditions. He pointed out that temperature variability and changing freeze-thaw cycles affect troop mobility and camouflage effectiveness, requiring continuous adaptation of tactics and equipment.

He also outlined the unique challenges of high-latitude combat, particularly polar day and night cycles, which affect operations and logistics. He emphasized the importance of morale and nutrition management for troops in extreme cold conditions. Research is currently being conducted to optimize rations and light exposure protocols, improving soldier endurance.

Finally, Captain stressed the importance of allied cooperation. Force integration and communication system compatibility are, in his view, top priorities for ensuring rapid response and effectiveness in extreme environments.