Executive Summary

Mission and Objectives

The mission of Op NANOOK 2022 is to conduct operations in Canada's North with Allies and other partners to ensure the Canadian Armed Forces' (CAF) readiness to operate in the North and improve interoperability with mission partners. The Operational Objectives are:

- Increase interoperability in the North with Joint Task Force North (JTFN);
- Overcome logistical challenges of the Northern operational area;
- Increased interoperability with allies (dealing with a common threat); and
- Support whole of government effort by supporting other governmental departments (OGD) and research and development (R & D).

OP NANOOK-NUNAKPUT

OP NA-NU includes community engagement (COMREL), reconnaissance shore landings (RECCE) and four scientific trials. HDW, MAR and GBY each have a different program.

JTFN activities involving CA and RCAF will also be taking place in the Arctic at this time, and the RCN supports JTFN by providing maritime surveillance, presence and sometimes interaction with CA personnel. The RCN is prepared to respond to any emergency situation in the Northwest Passage all the way to the border with Alaska. This could include a search and rescue, escort duties or a medical emergency. HDW and MAR plan to travel to Cambridge Bay as the point furthest west.

Research and Development

During OP NA-NK, four scientific trials will be conducted.

1. Maritime Evaluation (ME) with Towed Reelable Active Passive Sonar Trial combined with a Behavioural Response Study

    a) TRAPS and EMATT Trial

    TRAPS is a portable, containerized system with active and passive sonar capability for detection, classification, tracking and localization of underwater targets. A crane is required to deploy and tow the 12 meter (m) long sonar array. The TRAPS will be located on the HDW and will be involved in a 2-part trial taking place in Baffin Bay

    The TRAPS/EMATT trial will take place 15-18 August, 2022. The TRAPS will likely be operated using the trial plan from 2021, that is, active sonar pings every 10 kilometer (km) along the route between 10:00 – 15:00 local time. Each ping will be 11 seconds long, with a 1 second 1800 hertz (Hz) continuous tone, followed by a linear frequency sweep from 2000-2600 Hz lasting 10 seconds. For 2022, it is possible that the trial will be done within a smaller area, and if so, the pings will occur every 45 minutes assuming a tow speed of 8 knots (kt). If the ping is modified, it will be shorter, but within the same frequency range. In any case, the ping source level will be 210 decibels (dB) re 1 micro Pascal $(\mu Pa)^2 m^2$.

    In conjunction with the TRAPS trial, Expendable Mobile ASW Training Targets (EMATTs) will be tracked with TRAPS in a passive mode in order to evaluate the passive detection and

tracking capability of TRAPS. During this activity 4 EMATTs will be used.

b) TRAPS and Arctic BRS Trial

TRAPS will be used as an active sonar source to conduct a Marine Mammal Arctic Behavioural Response Study (BRS) in Davis Strait/Baffin Bay 19-21 Aug. The trial will take place 250 km from the east shore of Baffin Island, at latitudes south of Clyde River and north of Pangnirtung. The BRS will involve a Controlled Exposure Experiment (CEE) which will provide information critical for supporting future use of active sonar in the Arctic, and ultimately contribute to improved marine mammal mitigations for the RCN as required by the Species at Risk Act.

This trial will be undertaken in collaboration with Dalhousie University Large Whale Chair. The BRS will look solely at northern bottlenose and sperm whales, and will involve different activities. The HDW's rigid hull inflatable boat (RHIB) will be used by DRDC for the tagging and biopsy collection activities. Approval has been received from the Nunavut Wildlife Management Board to tag and biopsy the northern bottlenose and sperm whales. An animal care application has been submitted to the Dalhousie animal ethics committee.

Marine mammal scientists from Dalhousie University and/or DFO will be on board to assist with the trial. Their expertise will be critical for monitoring the whales' behavioural state to avoid adversely affecting the whales. It is intended to supplement typical visual observation techniques with electro-optical/infra-red systems and drone usage to maximize the chances of knowing where the whales are at all times.

2. Maritime Autonomous and Remotely Piloted Systems Trial

This DRDC trial is a demonstration of interoperability between mobile and stationary maritime autonomous and remotely piloted systems for the Above Surface Warfare "hold at risk scenario". A "hold at risk" scenario is the monitoring of a port or transit choke point with the intent of detecting submarines entering or exiting the area. This 2-day trial will be undertaken in shallow water near Pond Inlet, NU on 22-23 August 2022 with the support of MAR. The trial requires a location with depth of water under 100 m. One unmanned surface vessel (USV) will be deployed and recovered using a RHIB from MAR, and one recorder will be deployed prior to the experiment and recovered after completion. A crane will be required for the deployment and recovery of the equipment.

The key objectives include:

a. Testing the interoperability between mobile and stationary MARPS to demonstrate an ASW concept of employment in the Arctic environment;
b. Evaluation of alignment performance and quality of a new inertial navigation system (INS), on board an autonomous underwater vehicle (AUV), following stationary and moving calibration at high arctic latitudes;
c. Collection of high-frequency (450 kHz) sonar data from an USV to evaluate the performance characteristics of this sonar in the arctic ocean where the presence of freshwater layers affect the sound velocity profile;
d. Development of safe and efficient procedures for arctic MARPS operation, including deployment and recovery from an RCN platform; and
e. Provide DRDC personnel with Arctic training and experience for MARPS, onboard an

RCN platform.

The location of the trial is within the soon-to-be-established Tallurutiup Imanga National Marine Conservation Area (NMCA). The Government of Canada and the Qikiqtani Inuit Association signed an Inuit Impact and Benefit Agreement (IIBA) required for the establishment of the Tallurutiup Imanga NMCA on 1 August 2019. The IIBA acknowledges that DND conducts military related research in the Arctic, including Tallurutiup Imanga NMCA. In the agreement, DND commits to providing information to assess the environmental impact of its research programs on Tallurutiup Imanga NMCA, commits to providing unclassified summaries
of the planned research within Tallurutiup Imanga NMCA and, where possible, will provide the information requested in the IIBA for research proposals. Upon completion of DND research, an unclassified summary of the results will be provided. The information is to be provided to the Aulattiqatigiit Board which is a joint Inuit and Canada management board.

According to the IIBA, DND will be involved as appropriate for input to the proposed Tallurutiup Imanga NMCA Research and Monitoring Strategy before it is finalized.

3. Long-Range Underwater Acoustic Communication Trial

This trial will take place with the participation of the GBY that will deploy both transmitter and recorders. The trial will take place 20 – 23 August in the area of Gascoyne Inlet Camp (GIC), which is located within the soon-to-be-established Tallurutiup Imanga NMCA in the Parry Channel (Barrow Strait and Lancaster Sound).

The key objectives include:

- collection of acoustic and non-acoustic data;
- experiment new buoyancy and fairings; and
- achieve 50-to-100 km communication range by testing different communication schemes at relatively low active sonar frequencies.

The trial will be located within the Tallurutiup Imanga NMCA, and therefore DND must meet their commitments in the IIBA.

4. Integrated Surveillance via Layered Arctic Networked Defence Sensors Trial

In this activity three (3) acoustic hydrophone recorders (1 on the bottom, 2 in the water column) will be deployed for period of one year. These are passive recorders, with no surface expression or noise emissions. The recorders contain lithium batteries, and are composed of mainly silicon and metal, encased in a glass sphere. The moorings are composed of plastic and metal. According to the trial project manager, it is unlikely that the recorders or moorings will be dragged away by ice due to their depth (300 m below surface), and the odds are low that the recorders would be accidently released by their moorings.

A crane will be required for the deployment and recovery of the recorders. The recorders are expected to be recovered in summer of 2023 (summer 2024 as backup). The recorders will each leave behind about 50 kg of iron anchor weight due to their moorings.

Arctic Bay and Pond Inlet are both located within the Tallurutiup Imanga NMCA, and therefore DND must meet their commitments in the IIBA.

Territorial, Provincial and Municipal Government Involvement

- Qikiqtani Inuit Association (QIA)
- Kitikmeot Inuit Association (KIA)
- Nunavut Tuungavit, Inc.

Indigenous Community Engagement

An assessment using the Assistant Deputy Minister (Infrastructure and Environment) (ADM[IE]) Duty to Consult Determination guided template has been completed and territorial lands have been identified.

Community engagement for the Arctic communities is being carried out by JTFN. JTFN is sending out annual notification letters to each of the affected communities and Nunavut Tuungavik, Inc. The first Indigenous Engagement Session took place on 12 May 2022 with representatives of Qikiqtani Inuit Association (QIA) and Kitikmeot Inuit Association (KIA). At that session, JTFN were informed that Pond Inlet will be in open water and prime harvesting season during the time RCN is there. QIA asked for more information regarding the activities at Pond Inlet for this time period, specifically what activities will be undertaken and where.

Community engagement for Nain, NL and Hopedale, NL is being carried out by the CFB Goose Bay Real Property Operations Detachment. These communities are part of the Labrador Inuit Land Claims Agreement (LILCA).

As discussed previously, the locations of 3 of the trials are within the soon-to-be-established Tallurutiup Imanga NMCA, and according to the IIBA, information about the trials is to be provided to the Aulattiqatigiit Board which is a joint Inuit and Canada management board.

There will be written navigational warnings (NAVWARNs) and notices to mariners (NOTMARs) serve to warn vessel operators about training activity timing and location. These notices contain important information about activities which should remain in effect for the duration of the exercise. However, it remains uncertain how effective these systems are in warning Indigenous communities and those who may be undertaking traditional activities.

There are no expected permanent changes to the current condition or use of land (including coastal and marine area), air, water and resources. The exercises are temporary and will only take place for a few days at each location.

There are no expected significant adverse effects on air, land or water due to Op NA-NK 2022 after proposed mitigation measures are in place.