

# SOP A-352-2

## Preliminary Trial Plan

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**Trial Name:** ARC\_U\_UWW\_2022002\_TRAPS\_Arctic\_Trial

*Save your trial to DRENet Public Space P:\DRDC ARC Trial Plans with the Trial name above. Once approved, the Trial Plan needs to be passed to relevant Section Heads so they may allocate personnel resources and ensure their personnel have the required training etc to participate in the trial.*

**Planned Trial Dates:** 14 to 24 Aug 2022

**Written By:**

**Approved by:**

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Signature, Date  
Carolyn Binder, Defence Scientist

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Signature, Date  
Michel Couillard, Centre Director

### 1. Trial Overview

The aim of this trial is to provide the Royal Canadian Navy (RCN) with an evaluation of emerging containerized towed array systems through the deployment of the Defence Research and Development Canada's (DRDC) Towed Reelable Active Passive Sonar (TRAPS). Concurrently, TRAPS will be used as an active sonar source to conduct a Marine Mammal Arctic Behavioural Response Study (BRS) onboard HMCS HARRY DEWOLF (HDW) during Op NANOOK 22 (12 to 24 Aug 2022).

This trial will assess the HDW-class' ability to embark a functional and operational containerized towed array, including a tactical active sonar capability. Using TRAPS to support the BRS allows the RCN to demonstrate environmental stewardship through responsible use of active sonar in the Arctic. 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.

Five participants are required, including three from DRDC ARC. The TRAPS and BRS trials support the following DRDC projects: DNA\_005 ISLANDS, APW\_008 Anti-Submarine Warfare Systems & Acoustics, and INST\_001 M3 – Marine Mammal Mitigation.

### 2. Classification of Trial

This trial is UNCLASSIFIED

### 3. Scientific & Technical Objectives

The scientific and technical objectives for the trial are listed below:

1. Deploy TRAPS to perform passive recordings while sailing from embarkation port (Nuuk, GL) to trial site, and from trial site to disembarkation port (Pond Inlet, NU, CA).
2. Transmit active sonar pings while towing TRAPS to measure reverberation; can be done while sailing from embarkation port (Nuuk, GL) to trial site, and from trial site to disembarkation port (Pond Inlet, NU, CA).
3. Perform pilot study of controlled exposure experiment with sperm and/or beaked whales to assess the behavioural impacts of active sonar on Arctic whales.

### 4. High Level Trial Activities

The major activities / types of activities that are planned to achieve scientific and technical objectives are listed below:

1. Install TRAPS on HDW before the ship departs Halifax, NS.
2. Deploy TRAPS from HDW while ship is underway.
3. Test function of TRAPS active sonar.
4. Collect Arctic reverb measurements using TRAPS active sonar.
5. At BRS trial location, deploy archival acoustic recorders.
6. Once whales have been located, begin observation using visual and acoustic methods, EO/IR, and UAV. Observation is necessary before, during, and after CEE.
7. If approved, support marine mammal scientists in tagging whales from one of HDW's small boats.
8. Use TRAPS active sonar to conduct CEE, starting at low source level. Source level will slowly be increased, while carefully monitoring whales' behavioural state. At the first sign of whales displaying any adverse reaction active sonar transmissions will cease.
9. Recover archival acoustic recorders.
10. Remove TRAPS from HDW when ship returns to port in Halifax.

A detailed list of the trial activities will be included in the Detailed Trial Plan.

### 5. Major Equipment

A list of the planned major equipment for the trial is provided below:

#	Equipment	Point of Contact	Status of Equipment
1.	TRAPS	Trevor Ponee	Operational
2.	Tender	LCdr Ryan Bell (HDW OpsO)	Operational x2
3.	Slocum glider	Tim Murphy	Operational; confirming if possible to use in Arctic environment

4.	Acoustic recorders x3	Glen Merrick	Recorders are operational, buoy design ongoing
5.	XBT/XSV	HDW	
6.	Shipboard UAV	HDW	
7.	Marine mammal tags	Carolyn Binder	
8.	CTD	Glen Merrick	Operational
9.	Shipboard EO/IR	LCdr Trevor Ring (CFMWC)	Issues in OT&E
10.	Backup acoustic source and amplifier	Glen Merrick	Operational

A detailed equipment list will be included in the Detailed Trial Plan.

## 6. Preliminary Trial and Travel Schedule

The preliminary schedule for the major trial activities and travel is provided below:

- **12 Aug 22** Travel from Halifax, NS to Nuuk, GL
- **14 Aug 22** Depart from Nuuk, GL onboard HDW
- **15 Aug to 18 Aug 22** Transit to BRS trial location. Tow TRAPS while underway. Conduct a combination of passive and active sonar tests on a non-interference basis.
- **19 to 21 Aug 22** BRS trial.
- **22 to 24 Aug 22** Transit from BRS trial location to Pond Inlet, NU. Tow TRAPS while underway. Conduct a combination of passive and active sonar tests on a non-interference basis.
- **25 to 27 Aug 22** Travel from Pond Inlet, NU to Halifax, NS.

A detailed schedule will be included in the Detailed Trial Plan.

## 7. Location

All trial activities will occur in Baffin Bay/Davis Strait. Testing of TRAPS can be conducted while the ship is transiting between locations, on a non-interference basis, whenever ship speed is less than 15 kts. The BRS trial will be conducted near the location indicated in Figure 1. Location has been determined based on previous DFO/academic researcher experience of finding large whales near commercial fishing vessels in this area. Vessel AIS data will be collected to better understand and reconcile the acoustic sound pressure levels near the test environment.

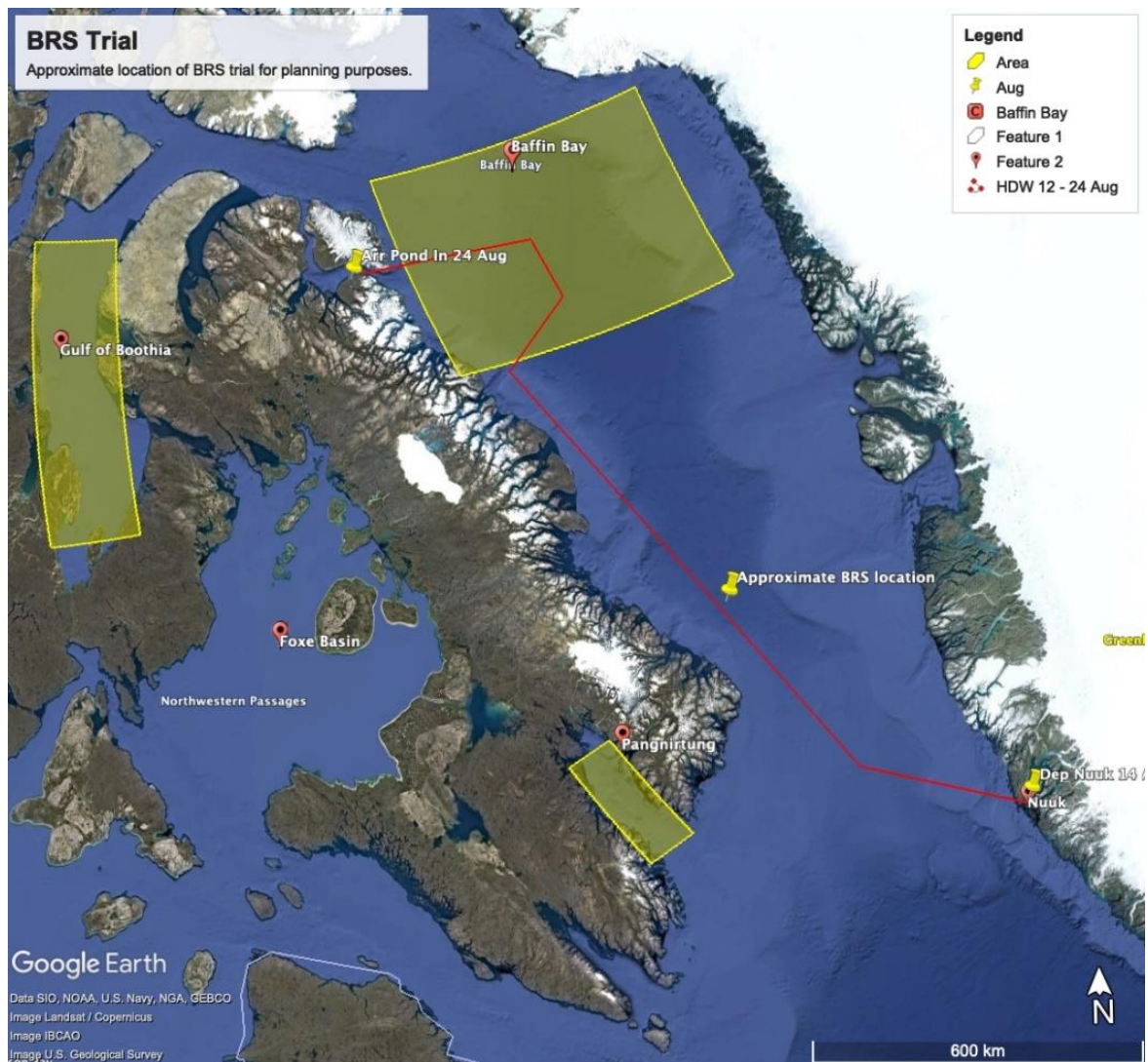


Figure 1 TRAPS and BRS trial locations. The red line shows a potential transit path for HDW between Nuuk GL, and Pond Inlet, NU. Yellow polygons were potential trial locations that have been removed from consideration. Approximate location of the BRS trial is 67.9875024 N, 61.4669513 W.

## 8. Permissions / Clearances – Water, Air and Land Space

Water, air, and land space clearances will be arranged by the MCC Planners for Op NANOOK.

## 9. Contact List

1. Trial Lead: Carolyn Binder, Mobile: (902) 209-5470, [carolyn.binder@ecn.forces.gc.ca](mailto:carolyn.binder@ecn.forces.gc.ca)
2. Trial Technical Team Lead: Trevor Ponee, xxx-xxxx, [trevor.ponee@forces.gc.ca](mailto:trevor.ponee@forces.gc.ca)
3. UWW Section head: Warren Connors, (902) 407-0524, Mobile: 902-478-6519, [warren.connors@forces.gc.ca](mailto:warren.connors@forces.gc.ca)

4. RED Section head: Erin MacNeil, xxx-xxxx, erin.macneil@forces.gc.ca

## 10. Participants

A preliminary list of trial participants is provided below:

#	Name	Organization	For DRDC: Section, Classification	Role in Trial
1	Carolyn Binder	DRDC	UWW, DS-04	Trial Lead
2	Trevor Ponee	DRDC	RED, EG-06	Technical Team Lead, TRAPS mechanical SME
3	Glen Merrick	DRDC	RED, EG-05	TRAPS electronics SME
4	TBD	TBD, either DFO or academia		Marine mammal SME
5	TBD	TBD, but likely DND		Marine mammal SME

This list is subject to change as the trial planning progresses. A detailed list of participants and their roles will be included in the Detailed Trial Plan.

## 11. Data Handling

The following data / types of data will be collected during the trial:

Data	Security Requirements	Special Data Handling
Acoustic - array	UNCLASSIFIED	DRDC techs to record and export
Acoustic – archival		To be deployed and recovered from HDW
Acoustic – UUV		To be deployed and recovered from HDW
AIS	UNCLASSIFIED	Trinity to deliver
EOIR		HDW IWO / OpsO to ensure recording
Photographic imagery		Collected by ship's photographer (CFTPO)
XBT		Collected by HDW crew
CTD		Collected by DRDC staff

## 12. Security

The general security risks for the trial are listed below. Risk reduction measures will be included in the Detailed Trial Plan.

- Acoustic data from both the Slocum glider hydrophone and the acoustic recorders collected during the trial will be treated as UNCLASSIFIED in accordance with the [NAVORD 3470-1 Maritime Operational Acoustic Policy](#), which states that raw acoustic data from the HARRY DEWOLF class is UNCLASSIFIED. No other contacts of interest are anticipated to be in the vicinity

of the trial. Furthermore, all acoustic recorders used during the trial are *not* operational CAF sonars.

- a. Note: The current MOAP has HDW raw data as SECRET but the revised edition should be signed and published before August 2022. [3470-1-eng reviewed with amendments for CFMETR and UWSU.docx \(mil.ca\)](#). If this change has not taken place by the trial date, all acoustic data recorded on TRAPS or DRDC acoustic recorders will be treated as SECRET//REL CAN/AUS/GBR/ NLD/NOR/NZL/USA.
2. Acoustic data collected from the TRAPS will be treated as UNCLASSIFIED, as the sensor's active and passive capabilities are not classified and the only TOI anticipated in the recordings will be HDW, whose raw data are UNCLASSIFIED (NAVORD 3470-1). For the purposes of interpreting NAVORD 3470-1 with respect to acoustic data recorders, TRAPS is *not* an operational CAF sonar.
3. Optical and infrared imagery collected by the HDW EOIR sensors will be released to DRDC as UNCLASSIFIED archival recordings, released by the HWD Information Management Officer.
4. All additional sensor data, including CTD and XBT profiles, visual sightings, and tag data will be UNCLASSIFIED.

### 13. Health & Safety

The major health and safety risks for the trial are listed below, along with the measures that will be taken to reduce the risk:

#	Potential Health & Safety Risks	Risk Reduction Measures
1	<i>Personnel will be working from a large ship and/or small boat in the ocean</i>	<ul style="list-style-type: none"> <li>• DRDC personnel will have a valid Health Canada Field Medical</li> <li>• DRDC personnel will have Standard First Aid Training</li> <li>• Personal Protective Equipment (PPE) will be worn</li> </ul>
2	<i>Personnel will be deploying and recovering bulky equipment over the side of the ship and/or a small boat</i>	<ul style="list-style-type: none"> <li>• PPE will be worn</li> <li>• Personnel with appropriate experience will be used and they will be briefed on the deployment/recovery procedures for the equipment as part of a safety brief prior to commencing work</li> </ul>
3	<i>Personnel will be working with equipment capable of producing high voltages</i>	<ul style="list-style-type: none"> <li>• PPE will be worn</li> <li>• Setup and operation only be personnel familiar with the equipment</li> </ul>
4	<i>Operating in a COVID-19 environment</i>	<ul style="list-style-type: none"> <li>• All trials personnel will abide by the CAF COVID-19 risk mitigation procedures in effect at the time of the trial</li> </ul>

Note: SOP A-783 Health & Safety will provide additional guidance on trial health and safety risk assessment and mitigation (at the time of writing, SOP A-783 had not been developed).

## 14. Environmental Impacts

The environmental risks associated with this trial are covered under an existing due diligence environmental assessment: Routine Environmental Effects Determination for Maritime Forces Atlantic Routine Exercises in the Canadian Arctic (Establishment File #: 1267-0100-2102, [Op NANOOK 21 EED](#)). The mitigation measures that will be used during the trial to reduce the environmental risk are being finalized through NETE modelling and consultation with MARLANT Safety and Environment. These mitigation measures will be part of the Op NANOOK 2022 EED, which will include updates to marine mammal mitigation procedures found in the Op NANOOK 21 EED specific to active sonar use.

At a minimum, mitigations will include:

1. Visual and passive acoustic monitoring period prior to using TRAPS active sonar.
2. Conduct ramp-up sequence prior to using TRAPS at full source level.
3. Maintain a Mammal Avoidance Zone (MAZ) of at least 500 m when operating TRAPS active sonar.
4. Minimum source level to accomplish trial objectives will always be used.
5. A minimum of two trained marine mammal observers will be required during BRS.

## 15. Overtime

During the trial DRDC participants will be on Sea Trial/Field pay, as per their collective agreement. While on travel, participants will be on Travel Duty, per their collective agreement.

The estimated overtime for the trial is 103 hours for DS and 190 hours for EG participants, or \$43,000.

## 16. Travel

The estimated travel costs for the DND personnel involved in the trial are \$20,000. All travel for DRDC participation in Op NANOOK will be submitted together by David Hooper. Travel will be considered approved when ADM(DRDC) signs the trial Briefing Note.

## 17. Reporting

The following reports will be produced during or after the trial:

1. Daily report, sent to SH/UWW, SH/RED, and PM (David Hooper) each day of the trial.
2. Summary report, produced within one month after completion of the trial to document the work that was done and preliminary results.
3. Scientific report of peer-reviewed journal summarizing scientific results of the trial, to be completed within approximately 1 year after the trial after post-trial data analysis has been completed.
4. A report/Scientific Letter to MARLANT Safety and Environment on results of the BRS.



5. A report/Scientific Letter to DNR 5, summarizing results of TRAPS passive and active sonar tests for DNR.

## 18. Glossary of Abbreviations

Abbreviation	Description
BRS	Behavioural Response Study
CEE	Controlled Exposure Experiment
CTD	Conductivity, Temperature, Depth sensor
DFO	Fisheries and Oceans Canada
DNR	Directorate of Naval Requirements
DRDC	Defence Research and Development Canada
EED	Environmental Effects Determination
HDW	Harry Dewolf
MAZ	Mammal Avoidance Zone
NETE	Naval Engineering Test Establishment
PM	Project Manager
SH	Section Head
RED	Research Engineering and Development
TRAPS	Towed Reel Active Passive Sonar
UAV	Unmanned Aerial Vehicle
UWW	Underwater Warfare
XBT	eXpendable BathyThermograph
XSV	eXpendable Sound Velocimeter