



**ACOBAR CONTRACT GRANT AGREEMENT NO.:** (212887)

**ACOBAR DELIVERABLE D1.1 Environmental Assessment Report:**

# **ENVIRONMENTAL ASSESSMENT REPORT FOR THE ACOBAR ACOUSTIC TOMOGRAPHY EXPERIMENT IN FRAM STRAIT**

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**Prepared by Marine Acoustics, Inc.**



## EXECUTIVE SUMMARY

The Nansen Environmental and Remote Sensing Center (NERSC) is planning to conduct a full-scale acoustic tomography experiment (ACOBAR<sup>1</sup> Experiment) in Fram Strait from 2010 to 2011 (2012), approximately 83 kilometers (km) (45 nautical miles [nmi]) from the west coast of Svalbard and 313 km (169 nmi) from the east coast of Greenland. The ACOBAR Experiment is building upon the initial underwater acoustic tomography system installed in Fram Strait during 2008 by the DAMOCLES<sup>2</sup> Integrated Project. The goal of the ACOBAR Experiment is the continued development and installation of an ocean acoustic tomography system in Fram Strait that will provide the needed data to monitor the changing heat flux and currents and understand the effects of climate variability on water mass transport and sea ice exchange through the Strait.

The experiment area within Fram Strait is triangular-shaped, covers roughly 25,921 km<sup>2</sup>, and lies wholly outside any territorial seas. Water depths in the experiment area range from about 1,400 m to over 5,000 m. Two vessels are scheduled to be used for deployment and recovery of experiment equipment: the research vessel (RV) *Håkon Mosby*, a 47-m vessel owned and managed by the Norwegian Institute of Marine Research (IMR), and the KV *Svalbard*, a 104-m Norwegian Coast Guard icebreaker and Offshore Patrol Vessel (OPV).

The two types of underwater acoustic sources planned for use during the ACOBAR Experiment and that are analyzed in this EAR are:

- Three Webb Research Corporation acoustic tomography sources, one at each corner of the triangle: frequency band 190 to 290 Hz, source level 190 dB re 1  $\mu$ Pa @ 1 m, signal type 100 Hz FM sweep over 60 sec, signal interval 3 hr or more, planned for 400 m depth but could be up to 800 m.
- One RAFOS source: frequency band 260 to 261 Hz, source level 180 dB re 1  $\mu$ Pa @ 1 m, signal type 1.5 Hz FM sweep over 80 sec, signal interval 6 hr, planned for 800 m depth.

An acoustic and environmental analysis has been conducted for the ACOBAR Experiment to determine the potential for impacts on the marine environment associated with the experiment's activities and the use of underwater active acoustic sources. Based on the experimental design and scientific analysis of the acoustic sources, the proposed experiment will have negligible potential for impacts to the environment of Fram Strait. The low source level of the acoustic sources, combined with the placement in relationship to Marine Protected Areas (MPAs), and the long intervals between transmissions, preclude the proposed action from affecting any MPA. The experiment will not affect any marine species that are listed as endangered or threatened under the U.S. Endangered Species Act nor any marine species that are listed as threatened (vulnerable, endangered, threatened, or critically endangered) by the International Union for Conservation of Nature (IUCN). No reasonably foreseeable behavioral takes of marine mammals (under the U.S. Marine Mammal Protection Act) are expected as a result of this experiment. Additionally, the conclusion resulting from the scientific analysis of the ACOBAR experimental activities is that no ethical issues are reasonably foreseeable, as the experiment has no potential for causing grave danger to marine mammals potentially occurring in the Fram Strait area.

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<sup>1</sup> ACOBAR = Acoustic Technology for Observing the Interior of the Arctic Ocean

<sup>2</sup> DAMOCLES = Developing Arctic Modeling and Observing Capabilities for Long-term Environmental Studies

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