The Arctic Construction and Intervention Vessel (CIVARCTIC) project investigates a dedicated design based for a vessel operating in the Northern Norwegian waters with seasonal ice.

The project is a KMB-project (knowledge-building project with user-involvement) between the following partners:

- MARINTEK
- STX OSV
- STATOIL
- Aker Arctic
- VTT

The primary objective of the project is to:

*Extend the operational season for installations and maintenance of subsea oil and gas installations in waters with seasonal ice.*

A business case has been established for the project:

- **Base**: Hammerfest
- **Northern route**: Norwegian part of the Barents Sea (main route)
- **Southern route**: Vest coast of the northern part of Norway.

The project is divided into the following work packages (administrative excluded):

- WP2 Intervention philosophies and tasks
- WP3 Design guide for metocean and ice
- WP4 Systematic parameter variation
- WP5 Environmental footprint

**WP2 - Intervention philosophy and tasks**

**Objective:**
Establish an intervention philosophy where unplanned maintenance operations can be done in areas with first year ice.

**Content:**
Review present and develop an alternative future intervention philosophy for subsea oil and gas systems in Arctic waters with seasonal ice.

**WP3 - Design basis for metocean and ice**

**Objective:**
Prepare environmental parameter design guide for selected Arctic regions

**Content:**
Review existing data. Collect subject matter expert opinions on future development of climate in the High North. Discuss applicability of historic data. Review plans for further improvements of metocean and ice forecasts and how improvements will influence weather window calculations. Develop design guide for metocean and ice data for selected Arctic regions.
WP4 - Systematic parameter variation

Objective:
Develop new knowledge and understanding of how to select optimum design parameters for a construction/intervention vessel working in Arctic waters with seasonal ice.

Content:
Review of methods for systematic parameter study in ongoing STX OSV project. Define critical characteristics for different phases of a vessel mission. Select optimization criteria for weighting different phases of vessel operations. Agree on a base design for future intervention/construction vessel for operation in ice infested waters. Conduct parameter variations of base design. Study influence of parameter variations using a combination of theoretical studies and model tests. Select and test specific models in the Aker Arctic ice tank. Compare “optimum” new designs with intervention vessels presently used in regions with seasonal ice. Review operational windows for operations in ice free and ice covered waters.

WP5 – Environmental footprint

Objective:
Document emission reductions possible for a new dedicated design for an Arctic construction/intervention vessel.

Content:
Review of MARINTEK’s strategic initiative on environment friendly shipping. Specify ways of reducing emissions to air and water. Define how to evaluate environmental footprint for vessels operating in Arctic waters. Specify cases for comparison of emission footprint for present vessels and vessel optimized in WP 4. Calculate and compare environmental footprints for conventional and “optimal” vessel.

Optimization of hull design wrt calm water performance using experience, model tests and CFD:

Optimization of hull design wrt sea-keeping and ice loading (Photo: Aker Arctic)

Ship model testing at MARINTEK.

A-model

B-model