

Presentasjon NFAS konferanse 4 oktober

Autonome systemer

Avanserte maritime operasjoner
ved UiT Norges arktiske universitet

Peter Wide

Prof. Teknologi og Sikkerhet i Nordområdene

Arbeidserfarenhet I nordnorge:

Norut Narvik

Universitetet I Nordland, Bodø

UiT Norges arkiske universitet, Tromsø

Autonomous systems

Focus on advanced maritime operations

includes all activities in relation to ship operations

- under,
- on and
- above sea level.

short perspective: semi-autonomous activities

longer perspective: fully autonomous systems

Autonomous maritime operations

Advanced skip operations will be a focus area in UiT:

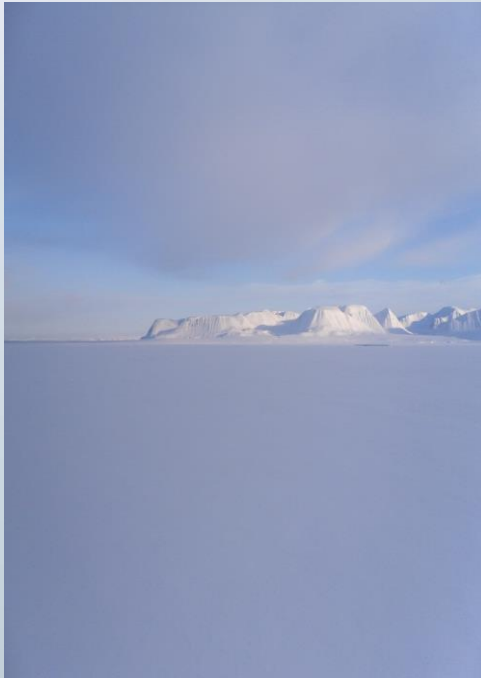
This includes **vessels and maritime operations in interaction between:**

- on-board sensor data or in close proximity
- intelligent control systems on-board
- communications technology
- command center on-land.

This will also include **advanced decision support systems** to provide a capability to operate skips remotely under semi- or fully autonomous control.

Build up an arctic based autonomous center

Access to “all” on-board sensor data from the research ship “Kronprins Haakon” 2017/2018 and systems “connected” to the ship.



Advanced information collecting in complex, real, natural and harsh environments.

Also as a testbed for autonomous functions.

UiT

THE ARCTIC
UNIVERSITY
OF NORWAY

Autonomous cooperation

Starting up a joint PhD – programme between the four Norwegian higher institutions:

- UiT Norges arktiske universitet
- NTNU Ålesund
- HSH, Høgskolen Stord/Haugesund
- HSN, Høgskolen i Sørøst-Norge

Autonomous maritime operations will be an area in the program

UiT

THE ARCTIC
UNIVERSITY
OF NORWAY

Autonomous / partly autonomous operations need intelligent solutions

MARKOM 2020 project – On-Land Command Center, conceptual study
Between 4 academic MARKOM institutions

Norges Arktiske Universitet

NTNU-Ålesund

HSN

HSH

Project leader:

Peter Wide

Budget:

600 000 Kr

Duration:

September - December 2016



UiT

**THE ARCTIC
UNIVERSITY
OF NORWAY**

Autonomous capability

Advanced maritime operations

results in increased values:

Safe operations
Technology development

Environmental benefits
Economic benefits.

UiT

THE ARCTIC
UNIVERSITY
OF NORWAY

On – land command center (OLCC)

An OLCC will be built at UiT-the Arctic University of Norway



UiT

THE ARCTIC
UNIVERSITY
OF NORWAY

On – land command center (OLCC)



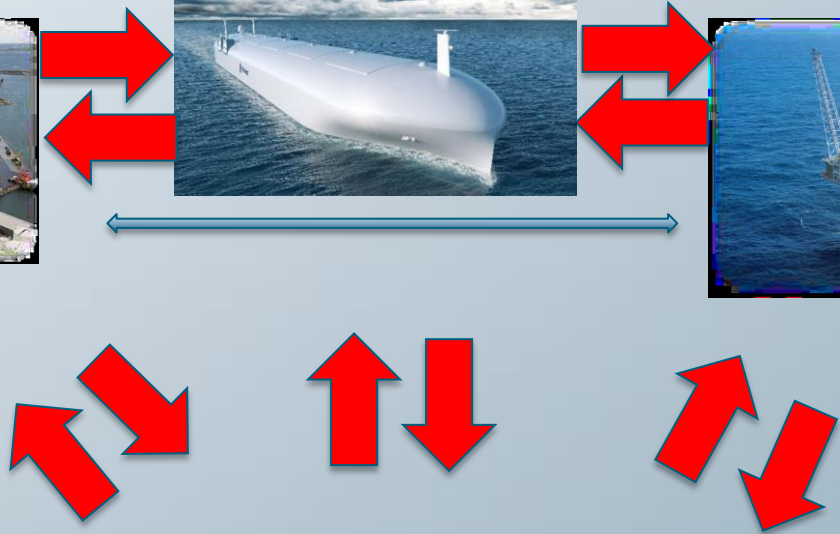
UiT

THE ARCTIC
UNIVERSITY
OF NORWAY

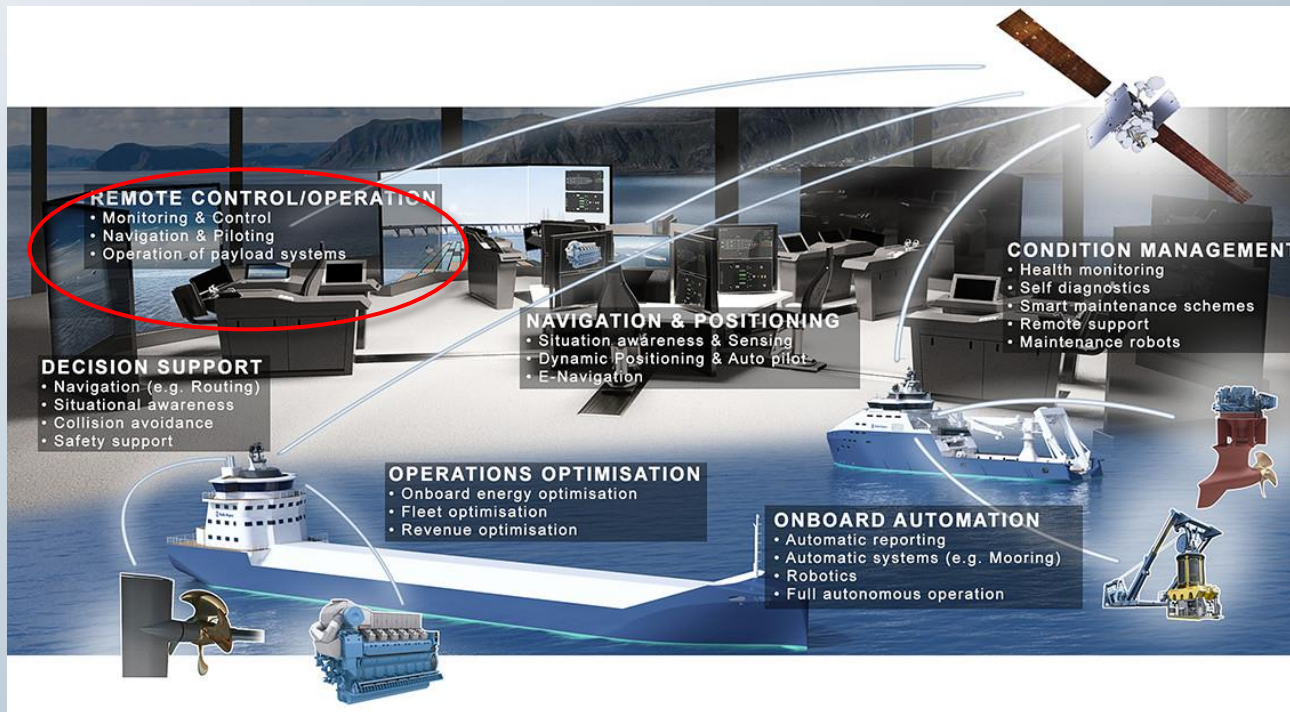
Ship to on – land command center



On – land command center (OLCC)



On-land Command Center (OLCC)



the Advanced Autonomous Waterborne Applications (AAWA)
Initiative by Rolls-Royce

UiT

THE ARCTIC
UNIVERSITY
OF NORWAY

Autonomous / partly autonomous operations

Established a research group at IIS, UiT:

Avanserte maritime fartøyoperasjoner.

External partners, for example:

Tokyo University of Marine Science and Technology

Joint projects:

Maroff and UTFORSK program

UiT

THE ARCTIC
UNIVERSITY
OF NORWAY

Autonomous / partly autonomous operations

New positions at UiT the Arctic university of Norway:

1 Professor - Avanserte maritime fartøyperasjoner.

1 Professor II – From University of Tokyo

Expected to include approximately 10 people working in the academic group of advanced maritime operations, before summer 2017.

UiT

THE ARCTIC
UNIVERSITY
OF NORWAY

Autonomous / partly autonomous operations

2 PhD students

Instituttet har vedtatt en forskningsstrategi som har fokus mot nordområdene. Avdekking av risiko ved driftsoperasjoner (på land, i luften og i havrommet), og utvikling av teknologi og beredskap for å redusere risikoen og optimalisere driftsoperasjoner i nordområdene, er eksempler på forskningsfelt ved instituttet.

Stillingenes forskningsområde/forskningsprosjekt og andre arbeidsoppgaver:

Stillingene er knyttet til fagmiljøet nautikk og forskningsgruppen *avanserte maritime fartøysoperasjoner*.

Autonome maritime farkoster er i dag ett fremvoksende akademisk fagområde og de to ph.d.-stillingene som utlyses har tema:

Avansert dynamisk ruting system for autonome/semi-autonome maritime operasjoner i polare farvann.

Stillingen vil omfatte videreutvikling av anti-kollisjonssystem for tidssimultan trafikkovervåkning til et automatisert anti-kollisjonssystem for konvensjonelle, semi-autonome eller autonome maritime farkoster. Prosjektet vil også se på værering, herunder isingsfare for autonom/semi-autonom fremføring av maritime farkoster.

Avansert skip – land interaksjon og støttesystem.

Stillingen vil omfatte bruk av intelligente sensorsystemer for å utvikle en *Operational Health Management* modell for maritime operasjoner. Det er et mål å etablere et landbasert kontrollrom som muliggjør datainnsamling der informasjonsmengde kan ekstraheres og analyseres for å presenteres som et dynamisk beslutningsstøttesystem.

Stipendiatstillingene vil bli en del av stipendiatporteføljen som vil inngå i den nasjonale fellesgraden i maritime operasjoner om denne blir akkreditert. Stillingene vil bidra med gjesteforelesninger og forskningsresultat til videre utvikling av emneporteføljen i fellesgraden.

1-2 PhD students

Connected to the announced professorship and industrial financed.

Ship to on – land command center

The expected future functions of the on-land operational center will include the following interactions with the research skip:

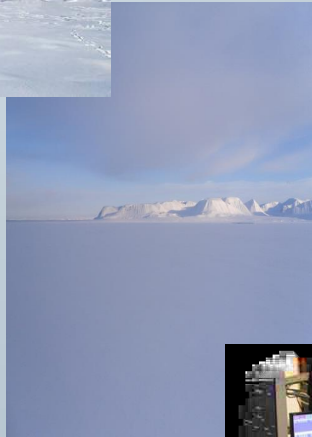
- Operational support/monitoring/navigation systems
- Operational prediction/ and optimization systems
- Path tracking/planning/decision systems
- System maintenance
- Overall risk assessment
- System management
- Communication system
- Host server system

In a longer perspective, the operational center will focus on remotely controlled and (semi-) autonomous skip functionalities including cost effective maritime operations, international regulations and legal challenges.

Build up an arctic autonomous application



Access to "all" on-board sensor data
from the research ship
"Kronprins Haakon" 2017/2018



On - land command center

"Decision systems"
provide support in
complex tasks

analyzing
"Black box"