



COAST

Centre of Excellence in Maritime
Simulator Training and Assessment

Annual Report 2020



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COAST Mission and Vision statement



VISION: To be leading provider of simulator training and assessment methods for maritime education

MISSION: To promote student-centred learning through simulator-based education.

The maritime industry in Norway is the second largest industry by trade just after oil and gas. It plays a pivotal role in the economy thereby seeking utmost significance from all stakeholders to ensure its sustainable growth. Continuous innovation in educational programs, research and development are the foremost necessity in increasing competence and value creation in the industry. The Centre of Excellence in Maritime Simulator Training and Assessment (COAST) aims

to support the competency development of future maritime professionals by integrating state-of-the-art solutions to Maritime Education & Training (MET). The long-term vision of COAST is to become an internationally recognized hub as the leader for education and research for MET. In order to accomplish this goal, the outputs of the first 5-year phase will be disseminated and communicated to all maritime training facilities across the world. COAST has four focus areas:

1

Synergistic simulation curriculum

3

Student engagement

2

Innovation in simulator training and assessment methods

4

Organizational development

The centre seeks to implement a series of strategies aimed at developing a culture of innovation that supports simulator-based training and assessment practices. The students, along with instructors, researchers, alumni, academic and industrial partners will be involved

in developing a "Community of learners" to manoeuvre state-of-the-art knowledge, create interventions and implement novel simulation practices for training and assessment in the maritime domain.



Highlights from 2020

This chapter presents some of the core activities of the centre during the reported time period. The detailed breakdown of activities under each focus area is presented separately.

The centre establishment

The Centre of Excellence in Maritime Simulator Training and Assessment (COAST) was formally established on 1st of June 2020. The COAST consortium comprises four institutions providing higher educational in maritime sector in Norway: The University of South-Eastern Norway (USN), Norwegian University of Science and Technology (NTNU), Western Norway University of Applied Sciences (HVL), and The University of Tromsø - The Arctic University of Norway (UiT), USN being the host institution for COAST.

The consortium adopted a unique visual identity including the COAST logo and associated digital identity markers. The COAST logo is based on a symbol that forms the letter C. It illustrates the radial movement of light signals from a lighthouse as seen from above, or the light sectors seen in naval charts. The COAST website (norway-coast.no) makes it possible for consortium members, collaborators as well as national and international stakeholders to follow activities, progress and results from the centre. The website has an integrated link to Cristin, the national research information system of Norway.

The centre management comprising the scientific leader and the centre coordinator, leads and coordinates the scientific and administrative work with the help of one pedagogical advisor and a research assistant. Each of the four partner institutions is responsible

for a specific Focus Area (FA) and associated planned activities in order to reach specific goals within their FA, and also be able to deliver results to the other FAs. FA1 is led by HVL, FA2 by USN, FA3 by NTNU and FA4 by UiT. COAST team at each partner institution comprises of a focus area leader, students, scientific staff (instructors, teachers, researchers) along with technical and educational support.

The scientific leader, project coordinator, FA leaders and student representatives constitute the executive board which plans activities and coordinates the work in COAST (see Appendix 1: [List of key members of the centre staff](#)). The steering committee is led by the vice rector of education at USN and consists of deans or department leaders from all four institutions along with the leader and co-leader from Student's Think Factory. The steering committee has a strategic role. In addition, it ensures the center has priority and support from the four institutions.

COAST has three reference groups and a Scientific Advisory Committee consisting of international domain experts from Sweden, UK and USA as proposed in the "Organizational structure" of the revised centre plan. The reference groups comprising 1) Students, 2) External Professional Organizations and 3) Scientific staff including instructors provide systematic support and critical input during the planning and execution of COAST activities.

Three student representatives from each partner institution comprises a total of 12 students forming the Students' Think-Factory group who elected Runar Jacobsen from NTNU as the leader and Andreas Amundsen Tøsse from HVL as co-leader, both of whom are also members of the steering committee.

Recruiting PhD fellows and personnel

A total of nine PhD research fellows (three at USN, and two positions at each partner institute) will be recruited to the joint PhD-program in Nautical Operations. Among them, seven candidates are in the process of recruitment (three at USN, two at UiT and one each at NTNU and HVL) while the remaining two positions will be announced in Autumn 2021. The recruitment process of PhD candidates has been a testament of extensive collaboration for the COAST consortium. Even though each University has their own internal processes for recruitment of PhD fellows, the process of discussions to find separate but related topics, research questions and design has been fruitful. The timeline of the planned Post-doc position in COAST is adjusted to match the research plan and output of PhD projects. As it is 2 year Post-doc, our evaluation is to start recruitment from the second year of COAST, after all the PhD projects has started. Additionally, this

process has highlighted the need to further collaborate across the consortium to enhance our vision of being world-leading provider of research-based simulator training and assessment methods, in particular for the maritime sector. COAST has achieved preliminary results in all focus areas, creating a solid foundation for our new recruitments to develop further.

Recruiting student assistants

The consortium partners have hired 16 student assistants (8 at NTNU, 3 at HVL, 2 at USN and 3 at UiT) as planned. The student assistants will support instructors in regular simulator classes for first year students, participating as technical support, organizing and controlling the simulations and supporting peers with theoretical and practical questions related to curriculum and certifications. Student assistants are also important contributors for supervising first-graders in their leisure time (afternoon, weekends and when the simulators are not in use for educational purposes) and in particular before certifications in the simulator-based training activities. Additionally, student assistants are central guides for visitors (5-6000 visitors at NTNU Ålesund yearly), external courses and to build social relationships among first graders and other students.



Figure 2: COAST virtual workshop



Figure 1: COAST digital kick-off

Digital kick-off

COAST adopted a digital kick-off solution amidst COVID-19 interruptions. On 21st October, close to 100 participants from 18 different nationalities including students, teachers, industrial representatives, researchers, practitioners, and the members of the International Association of Maritime Universities (IAMU) joined the "digital kick-off" (see [Figure 1](#)). The virtual opening event was a perfect opportunity to portray the vision of COAST to an international community of academics. The kick off was led by vice rector for education at USN Ingvild Marheim Larsen. Salman Nazir, the Scientific Leader of COAST, presented a general overview, and the rector at USN Petter Aasen delineated the foundation of COAST, followed by the Focus Area leaders briefly discussing their implementation plans

for COAST and deliverables for the next five years. Students' representative Runar Jacobsen and Anders Hanssen from NTNU and an industrial partner Christen Vagle from BW Offshore also presented their significant roles and expectations from COAST.

Virtual workshop

COAST virtual workshop on "Student engagement in COAST for the next five years" and "Creating a common baseline of the research design" was conducted on 22nd October where all consortium partners participated following the COAST kick-off celebration on the previous day (see Appendix 2: [COAST consortium workshops](#)). The program started with all partner institutions sharing the status of Focus Areas. Guest speaker Pål Isdahl Solberg from the Department of



Figure 3: Simulator instructors and students in cloud simulation exercise online



Education at USN introduced 'Models and examples of student engagement in the national and European context' followed by group activities, brainstorming sessions and focus group discussions among students, teachers and Focus Area leaders (see Figure 2). Pedagogical advisor at USN, Astrid Camilla Wiig chaired the sessions and led the follow-up work related to this workshop.

COVID-19 and COAST

The pandemic had unprecedented impacts slowing down many projects across the world; COAST activities were also affected, but due to the resilience of the team, the centre was able to adopt strategies required to cope up with the situation.

The establishment of COAST largely depends on the successful teambuilding process in its initial stage where face-to-face meetings and workshops are prerequisites for the trust building process and promoting a cooperative environment especially for all the partners from different geographical locations in Norway. Moreover, the sense of urgency imposed by the pandemic has exacerbated the usual level of collaboration among researchers and instructors.

All on-campus activities were either postponed or reduced to the essential during the pandemic starting March 2020. This made it challenging to carry out planned simulator-based activities in the partner facilities with the students as participants during autumn 2020. The students, teachers and researchers across

all consortium institutions had to swiftly adjust to the changed academic scenario that has been set up mostly relying on digital mediums. COAST partner institutions have found internal solutions to enrich their digital practices. These solutions ranged from purely digital to few hybrid lectures along with controlled simulator practices maintaining social distancing rules (e.g., in HVL, simulator practice sessions were increased to accommodate lost time due to earlier lockdown). In parallel, preparing the simulator and classroom premises before the arrival of new students in august 2020 was highly prioritised in NTNU which resulted in re-design of classrooms, marking of corridors and fluorescent stickers located at the simulator floor so that the students could identify distance during night-time simulations.

This rapid shift in teaching practices with impromptu digitalization of university teaching also resulted in enriched digital pedagogic toolbox for teachers along with innovative new ways to carry out essential activities. For example, during the lockdown in the spring 2020, the marine engineering students at USN were actively using the cloud simulator solution K-sim connect to ensure the progression of their studies (see Figure 3). The system also delivers a RADAR simulator for nautical students and has been introduced for the 1st year nautical students. The development is ongoing and will be able to run exercises of higher complexity in near future.



Change and diversity

COAST is gradually paving the way for a paradigm shift in maritime simulator training and assessment practices as well as change in contemporary organizational practices.

The nature of the coast consortium, i.e., partners from 4 different parts of Norway, naturally add diversity and inclusion to day-to-day COAST activities. Managing diversity both within the consortium and beyond is crucial for the long-term acceptance of COAST and to promote excellence. The maritime domain is traditionally a male dominant industry. COAST will continue to extend its efforts to increase the number of female students to be enrolled in the maritime bachelor programs and to integrate gender perspectives in maritime simulator education and training.

In addition, COAST in collaboration with another project [I-Merse](#) at USN is investigating into the potential usage of virtual reality technologies for the ease of simulator training of the visually impaired. In order to promote diversity and inclusion further, COAST plans to regularly publish blogs, articles and newsletters as well as arranged seminars putting focus on these important topics within the maritime community.



Activities and Results

FOCUS AREA 1: Synergistic Simulation Curriculum



Goal

Focus Area 1 aims to develop a synergistic simulation curriculum for maritime students in higher education, which can be disseminated internationally and to other similar professions making use of simulator training. Commonalities and differences in higher maritime education approaches will be identified through mixed methods (workshops, action research, document analysis, etc.) via a dialogue between students, trainers, scientific advisory groups and reference groups, for the purpose of informing the design of a collective, innovative simulation curriculum. Further, practices and procedures employed by different domains such as aviation, healthcare, space, transportation, process industry, etc. will be analysed through systematic literature reviews, document analysis and interaction workshops, in order to create benchmarks for maritime simulator education. This focus area will result in a report of the state-of-the-art knowledge regarding simulator practices and a collective simulation curriculum for piloting and testing among the consortium members.

Activities compared to the Activity Plan

COAST FA1 is currently working on the systematic literature review of simulator practices in maritime, aviation, and health education (see Table 1: [Status of activities in Focus Area 1](#)). HVL is in process of hiring PhD candidates (A4.1) who will be responsible for

planning, collecting, analysing and conducting the literature review. Still, there has been internal meetings to plan the procedure of conducting the systematic review (A4.2).

Additionally, FA1 is working on planning how to conduct a document analysis of Maritime simulator training curriculum in Navigation across Consortium (A6). There have been meetings with staff to conduct interview guide for students and staff (A6.1 and A6.2). This will be further developed through meetings across the consortium with students and staff.

HVL, leading the FA1 is also involved with activities related to the other Focus Areas. Student assistants are recruited regularly on navigation simulators.

At HVL, a survey was carried out in the spring semester of 2020 in order to obtain information from students on how they experienced the Covid-19 situation and digital lecturing. The data from the survey will be analysed and combined with the other surveys across the consortium to make a COAST report on Covid-19 experiences in simulator-based training and assessment practices. Moreover, HVL has upgraded screens in the simulators, and bridge B and C to provide staff and students with up-to-date technology for simulations in MET.



Plans for 2021

HVL is in the final phase of recruiting a PhD fellow (by H1 of 2021) and ready to launch the call for another PhD candidate. To start the process of conducting the systematic literature review of simulator practices in maritime, aviation, health and education during 2021 (A4.4), HVL will finalize plans and conduct the systematic review across various relevant databases. Workshops will be planned (A4.3 and A4.5) virtually or physically to categorize and discuss preliminary results with relevant participants across the consortium.

A first draft of the report on good simulator-practices from maritime, aviation, health, space, teacher education et al. (A.5) will be finalized during 2021.

In addition, HVL will begin working on the document analysis of Maritime simulator training curriculum in Navigation across Consortium (A6) by finalizing the interview guide (A6.1), interview students and staff (A6.4), and analyse the data (A6.5). Analysis of preliminary results will be finalized and used across the consortium in 2022.

Within the planning of a new building at campus Haugesund, the plan for the new simulator centre will be presented to the consortium during 2021 to gain feedback and take into account the expertise from the entire group.

Table 1: Status of activities in Focus Area 1

Description of activities	2020		2021		2022		2023		2024		2025	
	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2
A4 Conduct a systematic literature review of simulator practices in maritime, aviation, health and education												
A4.1 Hiring PhD candidates at HVL												
A4.2 Internal meeting to draft plans of the systematic review												
A4.3 Workshop												
A4.4 Conduct review. First draft of analysis of literature review												
A4.5 Workshop to share preliminary analysis												
A5 Report on good simulator-practices from maritime, aviation, health, space, teacher education et al.												
A5.1 PhD will conduct the first draft of report												
A5.2 Discussions with representatives in the Consortium												
A5.3 Revision and final draft												
A5.4 Publish report												
A6 Conduct a document analysis of Maritime simulator training curriculum in Navigation across Consortium												
A6.1 Conduct interview guide for students and staff												
A6.2 Internal meetings to draft questions and plan procedure												
A6.3 Discussions with consortium representatives												
A6.4 Interview students and staff												
A6.5 Analyse data and write preliminary results												
A7 Report from document analysis on consortium curricula												
A7.1 Conduct a first draft												
A7.2 Discussions with representatives in the Consortium												
A7.3 Revision and final draft												
A7.4 Publish report												
A8 Develop guidance document regarding curriculum synergies in future maritime simulator-based training (BA), including learning from good practice, based on A5 and A7.												

As planned Adjusted Delayed Cancelled



FOCUS AREA 2: Innovation in Simulator Training and Assessment Methods



Goal

The goal of Focus Area 2 is to evaluate the current state-of-the-art training and assessment practices in Maritime Education and Training (MET), and to develop novel simulator training and assessment methods by taking technological advances into consideration. Rapid technological development in new simulator training methods – e.g., cloud-based simulators, Virtual, Augmented and Mixed Reality (VR/AR/MR), custom “hybrid reality” – have provided a variety of new possibilities for the MET sector. Focus Area 2 of COAST will evaluate those potentials and introduce new training practices and effective learning methods for maritime students.

Activities compared to the Activity Plan

Following the internal workshop on “research design” in October, FA2 continued the follow-up activities under A9 (Conduct a research design) for developing new training and assessment practices with the use of new technologies and best training practices across the consortium. A set of sub activities have been developed which will contribute to a common baseline for research investigation (see Table 2: [Status of activities in Focus Area 2](#)).

Several workshops have been arranged at USN to discuss and explore the different approaches to research

design (see Appendix 3: [Institutional workshops](#)). A direct outcome from these local workshops were a preliminary research study titled “The continuum of maritime simulator-based training and education”. This study provides a comparative analysis of the existing simulators in use in MET practices, with consideration of their characteristics, strengths and limitations for the current and future maritime education. This research study has been a joint effort between maritime researchers and experienced simulator instructors at USN. To facilitate research-based maritime education and to reach the goals of COAST, it is of importance to establish and maintain a good collaborative environment for the researchers and simulator instructors for knowledge sharing and transfer. This research process has been considered a small step towards achieving this goal.

With regards to the activity A10 (Implementation of the research design), the initial preparation for the development of ethical guidelines for experiment, data management guidelines, standard agreements for co authorship have been carried out.

The collected data and experience from cloud simulator exercises are further utilized for the research on novel technologies, and how to implement and utilize these

Table 2: Status of activities in Focus Area 2

Description of activities	2020		2021		2022		2023		2024		2025	
	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2
A9 Conduct a research design												
A9.1 Internal workshops												
A9.2 Cross consortium workshops												
A9.3 Conduct a first draft of the research design												
A10 Implementation of the research design												
A10.1 Develop ethical guidelines												
A10.2 Make data-storing and user agreements across the consortium												
A10.3 Make standard agreement letters for all data-collection												
A11 Mapping what is excellent simulator-practices across consortium												
A12 Develop and synthesize research-based practices to create innovative training and assessment methods in maritime simulators across the consortium												
A13 Data collection												
A13.1 Formulate initial questionnaire for quantitative data collection across consortium												
A13.2 Formulate qualitative data collection plan (e.g., student and instructor interview, focus group discussions)												
A13.3 Pilot test and adjust the quantitative and qualitative data collection procedures												
A14 Data analysis for understanding the best practices of simulator-based training and assessment practices												
A15 Disseminations												

■ As planned
 ■ Adjusted
 ■ Delayed
 ■ Cancelled



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to effectively increase the students' learning outcome. The feedback loop among students, instructors and the developers ensure the optimization, usability and functionality of the simulator to suit students' needs.

Plans for 2021

The three (03) PhD candidates will start their projects by second quarter of 2021.

In light of the output of FA1 and comparative analysis of various simulators in use across the consortium (A9), FA2 will investigate the suitability of different simulator exercises and produce experimental results. Furthermore, FA2 will also initiate joint research articles through to enhance collaboration between maritime

researchers and experienced simulator instructors in finding research-based solutions to improve educational quality and student engagement.

Both qualitative and quantitative measures will be used in combination to comprehensively evaluate the impact. For data collection, a new nautical skill assessment questionnaire will be employed based on academic research as well as the key Knowledge, understanding and proficiency (KUP) items stipulated in STCW 2010. Data collection plan using qualitative methodologies (e.g., students and instructors' interviews, focus group discussions) will also be formulated in 2021.





FOCUS AREA 3: Student Engagement



Goal

FA3 will facilitate newly formed students' Think-Factory group as well as alumni networks in order to involve them in developing best practices of simulator training across the consortium. Since each campus has diverse organizational structures, developing a baseline to suggest relevant changes for students' active roles at each consortium member institute is of priority. FA3 will evaluate ongoing pilot studies of Simulator Student Assistants (SSA), revise the experiences together with students and instructors involved and implement collective role-descriptions, training and certification across the consortium members. Additionally, recent graduates will be invited to share their experiences and reflections in working seminars as part of an established alumni network. This focus area of COAST will result in revised and new collective models and organization of student engagement, student unions and alumni networks, and prioritizing of best practices for implementation across the members of the consortium. These models and organisational structures will be applicable to other professions (health, aviation, process industry) involving student active learning practices with simulations nationally and internationally.

Activities compared to the Activity Plan

COAST Focus Area 3 is currently working on revising and creating new models and organisations of student engagement. The activities of Focus Area 3 (see Table 3:

Status of activities in Focus Area 3) are dependent on physical meetings with the students and interactions in the simulators. During the COVID-19 pandemic, on-campus simulator training was restricted which made it challenging to carry out planned activities under FA3. NTNU is in progress hiring PhD candidates (A17.1). FA3 was leading the workshop on student engagement in October 2020 (A17.2). Overall, FA3 managed to carry on with the students' progress both in theory and practise maintaining the required progression of students. Moreover, virtual workshops on "Student engagement" and consequent workshops in partner institutions laid the groundwork for FA3 which will be materialized further in 2021.

Plans for 2021

The planned PhD project for FA3 will be started during the first half of 2021. All other planned activities will continue in parallel. The Students' Think Factory with 12 student representatives is established and will play a vital role for the design and development of a curriculum for the Simulator Student Assistants (SSA). The role of SSA is to support the students related to simulator activities, provide support for learning activities, and operate the simulator during evenings and weekends if requested. The SSA will also assist the simulator instructor during their scheduled simulator exercises. The SSA curriculum, training objectives and course plan will be developed during 2021 along with the training courses of SSA's at all partner institutions.

Table 3: Status of activities in Focus Area 3

Description of activities	2020		2021		2022		2023		2024		2025	
	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2
A16 Revised and new collective models and organisation of student engagement/involvement, student unions and alumni networks												
A16.1 Hiring PhD candidates		Cancelled										
A16.2 Workshop on student engagement												
A16.3 Workshop on SSA												
A17 Development and implementations of SSA (simulator student assistant) curriculum, course plan and training exercises.												
A17.1 Draft and Finalise SSA curriculum												
A17.2 Run pilot SSA course												
A17.3 Implementation of SSA course across COAST												
A18 Present excellence/innovative practices to other professions, nationally and internationally												

As planned Adjusted Delayed Cancelled

ENGAGING STUDENTS IN COAST



Arnt Myrheim-Holm Instructor, COAST

– What is the role of student assistants?

Student assistants support the instructors in preparation, planning, executing, and reviewing of simulator training. They are an important resource for novice students that instructors can work with and guide several student groups simultaneously. Experienced student assistants contribute with direct input to the curriculum as well as in execution and training. Having completed the course a year earlier, the student assistants also contribute with inputs in simulator training. They are valuable peer support—both the student assistant and the student ('expert student' and 'novice student') gain a high degree of learning from the interactions with each other.

– Why are student assistants important for COAST?

They can highlight student experiences directly and thereby add content influence, develop participation and co-determination with the instructor. Student assistants made responsible for after-hours training, evenings, and weekends, strengthen the all-round training of the students.

– What innovations will come out of this in MET?

Experienced student assistants expand the centres capacity in terms of setting up and operating simulators for internal and external research projects, facilitating tours, recruitments etc. The quality of simulator training is expected to be increased by having students as partners in the educational process.



Runar Jacobsen Student

– Why are student assistants important for COAST?

In my opinion, student assistants are one of the most cost-efficient measures a nautical university can implement. As a second-year nautical science student, I have been on both sides (as a "novice student" and now as an "expert student"). As student assistants are competent in running the simulator facility, they can oversee and assist peers when they practice in spare time. Furthermore, student assistants maintain and strengthen their own competence and aid in building social bridges between the first, second, and third-year students.

– What innovations will come out of this in Maritime Education Training (MET)?

I believe that student assistants are invaluable when it comes to MET. The student assistants can run the simulator facility by themselves, allowing for increased use of the facility both in class and in students' spare time. Manoeuvring a vessel is a technical skill that requires competence and many hours of practice. Students can practice almost whenever they want, with nearly every type of vessel in whatever scenario they wish—from anchor handling to sector light navigation. This gives far greater competence and sense of mastery than just classroom learning.

FOCUS AREA 4: Organizational Development



Goal

FA4 aims to bring about systemic educational and institutional transformations by strengthening COAST partnership within the consortium and beyond. The core focus will be to develop professional competence of the maritime instructors in the simulator-based training activities. FA4 will serve as an estuary for best practices in simulator training from other safety critical domains (e.g., health, aviation, process industry etc.) and the output will be further utilized to develop synergistic theoretical models for the intended organizational development.

Activities compared to the Activity Plan

The faculty staff at UiT arranged one internal workshop on the 10th of September discussing role of UiT in

FA4 (see Table 4: [Status of activities in Focus Area 4](#)). The group has started a literature review project related to simulator training in different professions (aviation, maritime and health science) which falls under FA 1 and will contribute to deliverables to FA 1 deliverables of COAST.

During the ordinary simulator-training program for the fall of 2020, the UiT simulator instructor have introduced a new, continuous assessment of the training. After each weekly session, the students report back on a digital form, reporting their assessment with respect to several parameters such as preparation, level of experienced difficultness and to what extent they manage to follow the progress of the training program. The information from each feedback has



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Table 4: Status of activities in Focus Area 4

Description of activities		2020		2021		2022		2023		2024		2025	
		H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2
A19	Develop models of organisational structures of Maritime institutions												
A19.1	Internal workshop at faculty level												
A19.2	Workshop on organizational development												
A19.3	Map organizational structures of maritime institutions in Norway and abroad												
A20	Professional development of simulator instructors and trainers												
A20.1	Meeting with Result. UiT department for development of education quality												
A20.2	Workshop with COAST simulator instructors												
A20.3	Workshop with instructors from aviation and healthcare												
A21	Evaluate, revise and suggest research-based models of organizing simulator-based training and assessment based on Focus Area 1-3.												
A22	Establish collaboration with external organizations												
A22.1	Collaboration with the maritime industry												
A22.2	Collaboration with government organizations												
A22.3	Collaboration with aviation industry												

■ As planned
 ■ Adjusted
 ■ Delayed
 ■ Cancelled



been used to adjust the content and progress of the training. The continuous student feedback method is continued during the spring of 2021.

In November, a new simulator project for using the ship simulators for an accident investigation was launched. One group of nautical science students participated in the project acting in different roles such as master, chief officer, shore-based managers. Another group of nautical science students acted as experts for the investigation teams. The project was successful and the students reported a very good learning outcome from the project.

Student representatives are nominated at UiT who also participated in the COAST workshops. Another planned students' workshop was postponed until January 2021 due to COVID-19 restrictions.

UiT has a long-term project together with the shipping company Hurtigruten who is using the navigation simulators for procedural training of officers of the watch. The project started in 2019 and still being continued except for the stoppages due to COVID-19. The scope and possibility of collaboration with the maritime industry will be continuously explored (A23.1). UiT has also entered into a cooperation with the Norwegian Coastal Administration, a government organization developing a more realistic simulator training for pilots operating large vessels (more than 100,000 deadweight tons). This project includes adjustments of

hydrodynamic models to increase realism and develop a specific training program for the pilots. One master student has also been assigned to this project.

As part of A22 under FA4, UiT have established collaboration with the Chief Flight Instructor responsible for the simulator training at Scandinavian Airlines. The collaboration will allow UiT staff to get access to and follow the simulator-training program from the early phase of developing training scenarios to the completed training of airline pilots.

Plans for 2021

FA4 will start the activity 20 (A20 - Develop models of organisational structures of Maritime institutions) in August 2021 according to the Activity plan. A20 will require input from Focus Area 1, 2 and 3. UiT staff will map models of organisational structures for simulator training used in other domains such as the aviation and health profession, and the process industry.

The PhD positions have been posted and UiT are in compliance with the planned progress. It is expected that the two PhD candidates will start in mid-February. The research design has started and the work on developing a theoretical model has started. The candidates will submit their complete PhD plans and application for enrolment to the National Joint PhD Programme in Nautical Operations before the mid-May. The PhD candidate projects will also play an important role in the development models for organisational structures.



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In addition to the already planned activities under each focus area, COAST will prioritise the improvement of the communication and dissemination strategy pertaining to the cultural differences among partner institutions as well as arrange activity-focused workshops in respective partner institutions (see Appendix 3: [Institutional workshops](#)). From an administrative perspective it will be ensured that the hours used would be reported in COAST and adjusted accordingly.

in the organization (FA4) of partner institutions. COAST will continue to produce scientific results and increase its visibility in national and international media (see Appendix 4: [List of publications](#) and Appendix 5: [COAST in the news and media](#)). Multilateral communication among existing SFUs in Norway, exchange of expertise between instructors and teachers as well as between maritime and other disciplines would be prioritised commensurate with the goals and vision of COAST.

Maturation of the cloud simulation technology and other digital mediums for simulator training would be specially focused in order to synthesize best practices (FA1), stimulate innovation (FA2), increase student engagement (FA3) and strategically implement change

COAST Plans and priorities for 2021



2020 was a challenging year with unprecedented restriction on travel, on-campus data collection and physical forms of scientific dissemination (e.g., seminars, conferences, meetings, public talks etc.). The lessons learnt from a digital 2020 will be implemented in 2021. By continuing and increasing the momentum of COAST activities in 2021, followings will be the main priorities:

- **Coordination of PhD projects and their respective research plans with that of COAST**
- **Coordination of research activities** (e.g., ethical approvals, data collection, workshops and seminars etc.) **on all partner institutions**
- **Development of novel and innovative methods of alternative teaching and instructions** (e.g., digital classroom, cloud simulators etc.)



Appendix



Bildet er utlånt av NTNU/Fotograf Geir Mogen

Appendix 1: List of key members of the centre staff in 2020

Name	Role in COAST	Institution
Salman Nazir	Scientific Leader	USN
Inger Johanne Lurås	Centre Coordinator	USN
Margareta Holtensdotter Lützhöft	Leader of Focus Area 1	HVL
Ole Kristian Nymoen	Leader of Focus Area 2	USN
Tron Resnes	Leader of Focus Area 3	NTNU
Bjørn-Morten Batalden	Leader of Focus Area 4	UiT
Astrid Camilla Wiig	Pedagogic advisor	USN
Hasan Mahbub Tusher	Research Assistant	USN

Appendix 2: COAST consortium workshops

Workshop series	Workshop venue	Theme of workshop	Date	Target group	Number of participants
COAST Workshop-1	Virtual	Project management, Communication, Student engagement	08/06/2020	Centre leadership, Focus Area leaders	19
COAST Workshop-2	Virtual	Student engagement, Research design,	22/10/2020	Centre leadership, Focus Area leaders, Students, Instructors	22



Appendix 3: Institutional workshops

Organizing partner	Theme of workshop	Date	Target group	Number of participants
USN	Workshop on K-Sim Cloud simulators	01/09/2020	Researchers, Instructors	9
USN	Mini workshop on COAST research and journal publication plans	18/09/2020	Researchers, Instructors	6
USN	Mini workshop on journal publication and identifying Strengths, Weaknesses, Opportunities and Threats of existing simulator practices	26/10/2020	Researchers, Instructors	6
UiT	UiT contribution to COAST activities Opportunities for staff and assignment of tasks	10/09/2020	Simulator instructors and faculty staff at UiT	12

Appendix 4: List of publications

No.	Title of publication	Author	Publication status	Journal/ Conference
1	The continuum of maritime simulator-based training and education	Amit Sharma, Tae-eun Kim, Morten Bustgaard, William C Gyldensten, Ole Kristian Nymoene, Hasan Mahbub Tusher & Salman Nazir	Under review	WMU Journal of Maritime Affairs
2	Development of a SAGAT Query and Simulator Experiment to Measure Situation Awareness in Maritime Navigation.	Xue, H., Batalden, B. M., & Røds, J. F. (2020, July).	Published	International Conference on Applied Human Factors and Ergonomics (pp. 468-474). Springer

Appendix 5: COAST in the news and media

No.	News description	Website	Publication date
1	Minister Iselin Nybø announced that USN will be awarded its first Center for Outstanding Education (SFU) for its commitment to maritime competence for a digital future	usn.no	12.12.2019
2	USN builds maritime expertise in a digital future. It gets noticed out there. One of our maritime research projects is a finalist in the award for a national prestige scheme.	usn.no	26.06.2019
3	COAST made it to the SFU 2019 final round	targlab.com	
4	Norway gets her first Centre for Excellence (SFU) in maritime training through USN	targlab.com	
5	Fire nye sentre for fremragende utdanning	Khrono.no	
6	Åtte i finalen om å bli Senter for fremragende utdanning	Khrono.no	
7	Avspark for USN sitt første Senter for fremragende utdanning	usn.no	30.10.2020
8	COAST sets sail with a virtual kick-off	coast-norway.no	16.11.2020
9	COAST conducts an internal virtual workshop on 'Student Engagement' and 'Research Design'	coast-norway.no	16.11.2020
10	PhD-positions in COAST announced autumn 2020	coast-norway.no	16.11.2020
11	UiT med i to senter for fremragende utdanning	uit.no	12.12.2019

