Development and Establishment of an Arctic Safety Centre in Longyearbyen
The mission of the Arctic Safety Centre is to contribute safe and sustainable human activity in the High Arctic. The ambition is that the Centre shall share this knowledge through education, tailor made courses, guidance of students, industry and residents of Longyearbyen.

**Education and Experience transfer**

- One year/one semester master studies or courses using natural sciences for improved risk and safety. (60 ECTS)
- PhD courses related to Arctic safety
- Practical, tailor made field safety courses for both academia and industry.
- Practical safety courses for the inhabitants of Longyearbyen.
- Collect, communicate and use relevant field safety data applicable for the region of Svalbard. Give advise and share experience and competence in relation to safe and sustainable presence at Svalbard.
Academic content
- Natural sciences -

- Relevant content from all the UNIS departments within;
  - Biology, Geology, Geophysics, Technology
- Contribution from other institutions within relevant topics such as (but not limited to):
  - Arctic Wildlife
  - Toxicology
- Use of existing data series and circumpolar observation networks (e.g. SIOS)

Institution partners:
-The University Centre in Svalbard, Norwegian Polar Institute; University of the Arctic; Copenhagen University
Academic content
- Risk and safety theory -

- Risk Management and safety theory
- Method and Tools for risk management
  - Qualitative and quantitative risk assessment methods.
- Societal Safety
  - Safety understanding & safety culture
  - Risk management strategies
- Emergency Preparedness
- Management and organization
  - The human factor; risk perception, understand and relate to risks involved. Physical and psychological stress reactions and countermeasures.

Institution partners:
Norwegian University of Technology and Science; NTNU, Sintef, University of Stavanger; UiS, University of Tromsø; UiT
Academic content
- HSE “best practice” -

- Case studies from complex scientific operations in the Arctic and Antarctic.
  - Lance freeze-in
- Experience from planning and execution of field operations.
  - Students in the field
- Findings and experiences learned from accident scene management, SAR operations and accident investigations.
  - Avalanche LYR, Maxim Gorkey, Moseldal incident, Mining incidents
- Running updating of operational procedures and HSE manuals
  - Oden Expeditions

Institutions listed as partners:
- University Centre in Svalbard; UNIS, Norwegian Polar Institute; NP, The Governor on Svalbard, Lufttransport AS, Copenhagen University, INTERACT, Forum of Arctic Research Operators; FARO, Visit Svalbard
**Project Organization and Resources**

**Steering Committee**
UNIS (Chair + 2 members), NP, Sintef / NTNU, UiT, Interact, UArcitic.

**Reference Group**
Important stakeholders not part of the workgroups

**Project Manager** - Ann Christin Auestad

**Stud. Adm.** - Anne Sølberg Ellingsen

**Admin. support**
Support from HR/Economy/HSE

**Scientific Departments**
Arctic Geology, Arctic Technology, Arctic Geo Physics, Arctic Biology

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**Work Groups and Work Packages:**

1. Risk and Safety Theory and Integration of natural science observation for improved field safety also using
   - i. Master courses
   - ii. Safety courses for industry, tourism and academia
2. Field Safety at Arctic field stations
   - i. Pilot Course
   - ii. Generic Safety Course
   - iii. Text book Safety at field Stations

3. Integration of natural science observation for improved field safety.
   - i. Pilot Course
   - ii. Master course

4. Develop Longyearbyen to become a ‘High Arctic Safety Awareness Society’
   - i. Pilot Course X2
   - ii. Re-vitalizing Safety Forum
   - iii. Formalize sharing of competence with local Council
**Plan**

<table>
<thead>
<tr>
<th>Year</th>
<th>Activities</th>
</tr>
</thead>
</table>
| 2016 | • Project kick-off  
       • Hiring of adjunct positions  
       • Work shops  
       • Meetings |
| 2017 | • Hiring of adjunct positions  
       • Development of safety training at Arctic field stations  
       • Further development of safety theory  
       • Further development of pilot course “Utilization of scientific observations for increased Arctic field Safety  
       • Networking towards universities |
|      | • Pilot courses:  
       • Practical safety courses for the residents  
       • Development of tailor made safety courses for industry – run (if requested)  
       • Position Paper  
       • Develop a model for funding when Arctic Safety Centre project period is complete |
| 2018 | • Run Pilot  
       • Risk assessment of Arctic Natural Hazard  
       • Field safety at field station for station managers  
       • Suggestion to UNIS board for opening of Arctic Safety Centre |
|      | • PHD Arctic Safety  
       • Hosting a Conference in Arctic Safety |
| 2019 | • Opening of Arctic Safety Center – August 2019  
       • One year master studies or courses using natural sciences for improved risk and safety. (60 ECTS)  
       • Practical safety courses for the industry  
       • Competence center for local settlements at LYR. |
<table>
<thead>
<tr>
<th>Management of Arctic Safety</th>
<th>Safe Operation in the Arctic Conditions</th>
<th>Preparedness and Response in an Arctic Context</th>
<th>Risk Assessment of Arctic Natural Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupational safety</td>
<td>Industrial safety</td>
<td>Societal safety</td>
<td>Industrial safety</td>
</tr>
<tr>
<td>Industrial safety</td>
<td>RAMS (Reliability, Availability, Maintainability and Safety)</td>
<td>Industrial safety</td>
<td>Occupational safety</td>
</tr>
<tr>
<td>Technology management</td>
<td>Technology</td>
<td>Society</td>
<td>Organization</td>
</tr>
<tr>
<td>Organization</td>
<td>Technology management</td>
<td>All types of master students</td>
<td>Technology, society</td>
</tr>
<tr>
<td>All types of master students</td>
<td>All types of master students</td>
<td>All types of master students</td>
<td>Natural and environmental sciences, and technology</td>
</tr>
</tbody>
</table>

| Erik Albrechtsen            | Abbas Barabadi                         | Bjørn Ivar Kruke/Are Sydnes                   | Markus Eckerstorfer/Mads Forchhammer     |

- Theoretical foundations for safety management
- Incident prevention by experience feedback
- Framework conditions for management of safety: external conditions, regulations, organizational context
- Accident models and theories
- Accident analysis framework and sources for incident data
- Barriers against loss
- Principles, steps and application of methods and tools in safety management
  - Risk assessments
  - Reports of unwanted occurrences and conditions
  - Incident investigation
  - Measurement of safety performance
  - Audits and inspections
  - The human element in accident prevention.
  - Deviation handling
  - Planning and execution of operations
  - Decision-making
  - Cases
- Reliability, main inability, availability analysis (RAM)
- Human and equipment performance in the cold climate conditions. Human reliability analysis and failure modes/mechanisms
- Uncertainty analysis and management in the Arctic
- Prediction the operational condition for safe operation in the Arctic. New technology application. Remote operations
- Available database, guidelines and standards
- Reliance concept and unforeseen failure in the complex operational conditions.
- Data and information sharing and exchange
- Reliability of critical infrastructure Cases
- Robust communities in the arctic context, including risk awareness/perception/communication
- Key characteristics of different types of undesirable events such as incidents, accidents, crises and emergencies
- Key challenges (individual and organisational) we may face in different types of undesired events (such as stress and stress management, information processing, coordination, centralization and decentralization in crisis management, etc.).
- Regulation and structure of the preparedness and response systems in the arctic
- Maritime preparedness
- Offshore and onshore search and rescue
- Human reactions prior to, during and after undesirable events.
- Training and exercises
- Climate change and preparedness.
- Cases
- Understanding arctic natural hazards:
  - Weather hazards
  - Slope hazards
  - Biohazards
  - Cryohazards
- Climate change effects on hazards
- Search, analyse, and interpret a wide range of field based and remote sensing borne monitoring data from and about arctic natural hazards
- Data acquisition methods for researching different natural hazards
- Theoretical foundations for risk assessments
- Application of methods for assessment of arctic natural hazards
<table>
<thead>
<tr>
<th>Work group 1 + 3</th>
<th>Work group 2</th>
<th>Work group 4</th>
</tr>
</thead>
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<tr>
<td><strong>Management of Arctic Safety:</strong></td>
<td><strong>Preparedness and Response in an Arctic Context:</strong></td>
<td><strong>Develop Longyearbyen to become a ‘High Arctic Safety Awareness Society’</strong></td>
</tr>
<tr>
<td>- Explain the arctic risk factors</td>
<td>- Community resilience</td>
<td>- Biologic hazards” Safety course</td>
</tr>
<tr>
<td>- Planning/Execution</td>
<td>- Risk acceptance</td>
<td>- Avalanche awareness course</td>
</tr>
<tr>
<td>- Decision making</td>
<td>- Training and exercises</td>
<td>- Free courses for LYR inhabitants</td>
</tr>
<tr>
<td>- Human Factor</td>
<td>- Crises management and a high degree of uncertainty</td>
<td>- 2-3 evenings</td>
</tr>
<tr>
<td>- Best practices</td>
<td>- Social Science/Engineer Students</td>
<td>- Started up 2017</td>
</tr>
<tr>
<td>- Social Science/Engineer Students</td>
<td>- 10 ECTS</td>
<td>- Run in June</td>
</tr>
<tr>
<td>- 6 weeks</td>
<td>- Start up 2019</td>
<td></td>
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<tr>
<td>- Start up 2019</td>
<td></td>
<td>- Run in February</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Safe operation in Arctic Conditions:</strong></th>
<th><strong>Risk Assessment of Natural Hazards in the Arctic:</strong></th>
<th><strong>Tailor Made Safety Courses for Industry and Academia</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Human performance</td>
<td>- Safety course for station managers</td>
<td>- «Etter/Videre utdanning» students</td>
</tr>
<tr>
<td>- Material behavior</td>
<td>- Manual</td>
<td>- 10 ECTS</td>
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<tr>
<td>- Failure mode</td>
<td>- Station Managers/Engineers/Natural Science</td>
<td>- 6 weeks</td>
</tr>
<tr>
<td>- Remote sensing</td>
<td>- 10 ECTS</td>
<td>- Start up 2019</td>
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<tr>
<td>- Forecast of arctic operations</td>
<td>- 6 weeks</td>
<td></td>
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<tr>
<td>- Engineer/Social Science Students</td>
<td>- Starts 2018</td>
<td></td>
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<th><strong>Field Safety at Arctic Field Station:</strong></th>
<th><strong>Run in shoulder season September-November</strong></th>
<th><strong>Risk Assessment of Natural Hazards in the Arctic:</strong></th>
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<td>- Safety course for station managers</td>
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<td>- Bio</td>
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<tr>
<td>- Manual</td>
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<td>- Meteorology</td>
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<td>- Marine</td>
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<td>- Cryosphere</td>
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Thank You!

• Web page
  – http://www.unis.no/resources/arctic-safety-centre/

• Facebook
  – https://www.facebook.com/arcticsafetycentre/