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T2.5. ARCSAR Innovation and Knowledge Exchange event 1

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EXECUTIVE SUMMARY

The first Innovation and Knowledge Exchange event was held in **Reykjavik, Iceland on October 9, 2019**. The event was called: *Workshop on innovative emergency response solutions, training and knowledge sharing with companies, local communities and voluntary organizations in the ANA region*. The event coincided with the ARCSAR Annual Dissemination workshop (T5.2) organized by Laurea University of Applied Sciences and the announcement of the ARCSAR Innovation arena (D2.2). All workshop participants were encouraged to join the ARCSAR Innovation arena to connect to and create ideas together with the ARCSAR partners. This workshop highlighted the possibilities for further cooperation with key stakeholders from voluntary organizations, local companies, and communities, practitioners, authorities, and academia. It gave some key themes for establishing partnerships, new initiatives and projects in developing voluntary and community capacities including training, technology and network building.



Picture 1. The first Innovation and Knowledge Exchange event gathered ARCSAR partners and external participants from various organizations



1. Background

The main goal of the Innovation and Knowledge Exchange events (T2.5) is to facilitate the exchange of information on innovations and knowledge and increase the likelihood of innovation and best practices uptake. The events are arranged in Year 1, 2, and 3 and will all have different themes, facilitate continuous mapping of needs, monitoring of solutions, and provide a forum where practitioners can engage with innovation providers. Knowledge transfer is incorporated in various ways during the events i.e. from peer-to-peer practitioner learning, learning from local communities including indigenous peoples and volunteers, workshops face-to-face and on-line, use of case studies and scenarios, and through table-top exercises. Tacit learning will be captured particularly from practitioners, local communities, and voluntary groups.

The theme for the first event was local communities and voluntary organizations in search and rescue, and the goal was to learn from their experiences and best practices, build a network, and discuss innovative approaches, tools and procedures to emergency preparedness and response together with the ARCSAR partners, local community representatives from the ANA region, and voluntary organizations. This theme for the first event was derived from the gaps recognized at the WP2 workshop in Rome, where the discussions highlighted that there should be more systematic involvement of local communities, voluntary organizations and companies in SAR. and These gaps were also identified in the WP2 report including issues related to, for example:

- Enhanced involvement of Indigenous partners and local communities in SAR activities
- Collection and dissemination of best practice of communication between local and SAR communities
- Utilization and involvement of spontaneous volunteers
- Definitions of roles and responsibilities should be streamlined, encourage action and ensure well-functioning cooperation in case of emergencies
- Technologies and training to allow local communities access to satellite data services and other technologies

Although local communities and voluntary organizations are often involved in emergency response, small communities might lack resources and equipment, especially in the light of growing tourism and business. Some have come up with innovative approaches to challenges posed by the realities of the ANA region. This event aimed at mapping the key challenges, gaps, and innovative approaches to utilizing local community and voluntary capacity in the best possible way.

2. Workshop structure

The Innovation and Knowledge Exchange event coincided with the ARCSAR Dissemination workshop organized by Laurea University Of Applied Sciences. The dissemination workshop presented current project activities and deliverables, including the ARCSAR Innovation arena, to the external participants and ARCSAR project partners. The dissemination workshop aimed at increasing readership of project reports, increasing network membership and interaction, and widening stakeholder engagement.



The rest of the day was dedicated to the first Innovation and Knowledge exchange event, which was structured as a workshop. The workshop was a combination of presentations and participative discussions in smaller groups. The workshop discussions had four thematic topics within the local community and voluntary organization involvement in emergency preparedness and SAR:

- technological development and innovations
- competence development
- the role of volunteers and local communities in SAR
- network development and cooperation concepts

The workshop started with four example presentations on either one or several of these thematic topics from the community, voluntary organization, academia, and authority perspectives. The presentations are summarized in the next chapter.

The group was divided into four smaller groups for the discussions. Each group got to discuss each topic as dedicated moderators and note-takers circulated between the groups. Key points from each thematic topic were presented to the whole group at the end of the workshop.

3. Summary of presentations

The workshop had four presentations before the group discussions to give some good examples of innovative technology, procedures and tools, and the roles of volunteers and the local community from different perspectives.

Roope Siirtola, project manager of the Arctic disaster management project, from the Finnish Red Cross gave a presentation on **Future of Arctic Disaster Management – Red Cross Perspective**. Red Cross has a history of operating in the Arctic and, as for today, has significant capacity in the region, with a total number of around 10 000 active volunteers. Often volunteers from Red Cross are on-site before, during, and after an incident. [A study by the Finnish Red Cross](#) recently mapped the disaster management capabilities of the Red Cross in the Arctic countries and found that while the capabilities locally are good, there are not enough local resources for larger incidents and hazards. However, the Red Cross has good mobility across the Arctic and can create and send teams internationally for crisis response.

The Finnish Red Cross also has the capacity to establish Emergency Evacuation Centers (EEC) and Emergency Evacuation Hospitals (EEH) for larger disasters and accidents. EEC can leave quickly and move fast, delegates are professionally trained, and the volunteers are very involved in the tasks of setting up the EEC and receiving people. EEH supports local medical capacities, has a capacity for 20 people, has possibilities to do some surgeries, has highly trained professionals from the hospitals. EEC and EEH are already packed in trailers and can be moved with a car or plane. The total response time for the EEC and EEH and the volunteers in Finland is around 2h. The Finnish Red Cross has also been developing bracelet technology to track evacuated patients, for example in a cruise ship evacuation situation. Tracking all evacuated passengers is often difficult as people start moving around, volunteers take people in their homes and so on. The bracelet is tagged with a bar code to each evacuated person with some basic information and additional details about i.e. patient's condition. The barcode can be read with a smartphone later and all information is stored in the cloud. This is still a prototype in a testing phase, and



the Red Cross also has to solve the data protection challenges. They are also open to working together with the cruise industry to develop the technology further.

Siirtola mentioned that the Red Cross often practices with authorities and other stakeholders. The Finnish Red Cross, for example took part in the recent Arctic Coast Guard Forum exercise Polaris 2019 testing the bracelet technology and establishing the emergency evacuation centers. Red Cross will soon publish a paper on Arctic disaster management from the medical perspective.

Professor Odd Jarl Borch from Nord University gave a presentation from the academic side on: **Disaster management and community resource integration – examples from NORDLAB**. Nord University has extensive cooperation with universities, authorities and industry in the Arctic. Borch highlighted safety risks and capabilities, and the importance of domain awareness of different industries in the Arctic including fisheries, government, civilian and military activity, cruise and tourism industry, oil and gas, and ocean mineral mining sector. He specifically mentioned the challenges with the increasing cruise and tourism industry and natural disasters when it comes to safety, as local communities in the Arctic will be in a key role in case of emergency. Borch categorized the activities and challenges based on the availability of infrastructure and the size of the incidents. He highlighted that there is a need to match these aspects to local capacities and education.

He mentioned that in larger incidents that happen in or close to small local communities, the whole community has to help with the response, including both organized and non-organized volunteers. He mentioned, for example, the Viking Sky incident in 2019, the tsunami in Greenland in 2017, and the major avalanche in Svalbard in 2015. There is a need to provide more equipment, education, and training to communities and voluntary organizations when it comes to major emergency response efforts. He categorized the local community resource and innovation needs to physical, organizational and managerial training needs. Borch mentioned the possibility to train in a simulator environment, with courses and competence packages for Arctic specific response and coordination. Nord University has been developing courses and exercises in the Nord University preparedness management lab (NORDLAB) together with the emergency preparedness institutions. The course selection includes Polar Code courses, incident commander and on-scene coordinator course, and crisis management staff courses.

Karen Ósk Lárusdóttir, project manager SAR for the Icelandic Association for Search and Rescue (ICESAR), presented **ICE-SAR as an organization and talked about the role of volunteers in Iceland**. ICE-SAR has 93 teams all around Iceland with about 6.000 active members. Of those 4200 are “on roster” meaning that they can receive responses to an emergency. ICE-SAR has approximately 1500 operations annually with a volunteer response. All teams are independent but under a unified command of the national command and 16 regional commands. Their teams have various disciplines based on the interests of the members. Some teams are land rescue only but many teams have land rescue and maritime capabilities. The challenges in Iceland with responses are often quite extreme, so ICE-SAR has a major emphasis on training. Minimum training often takes one to two years with mountaineering, first-aid, communications and so on. To become an advanced rescuer one or two years are needed plus the basic training.

Many roads in the rural areas of Iceland run over mountain passes above 400-meter elevation and that in itself poses challenges even for the local population. The increase in tourism has led to some increase in



workload for rescue teams. Sometimes there are mass injury accidents that small local teams have been the first to respond to. ICE-SAR has operated an accident prevention program from the foundation of the first rescue team and in 2010 Safetravel was established to directly target tourists. The assets in Iceland are often far away, and ICE-SAR cooperates with the Icelandic Coast Guard a lot.

To strengthen the response to mass injury accidents, ICE-SAR has placed specialized shelter equipment in rural areas to provide capabilities to meet those events where the injured have to be sheltered until further resources arrive for evacuation. For this purpose, ICE-SAR and the aviation authority in Iceland ISAVIA created a program in 2016-2019 where 11 rescue trailers and one airdroppable unit were placed strategically around Iceland. This was in addition to similar equipment already available in a few places fundraised by local teams. These trailers include rofi tent, pressure tanks, heaters, generators, stretchers, blankets and rescue ladders.

To get also an authority perspective, **Senior Constable Risto Mertala from the Lapland Police** gave a presentation about: **Search and Rescue methods and the tourism safety network on Lapland**. In Lapland Police resources are often limited, so the Lapland Police has to use resources extensively and cooperate closely with other authorities, voluntary organizations, and tour companies to provide SAR in Lapland. The tourism safety network in Lapland has established Arctic Rescue Guides that provide assistance in SAR cases. Voluntary organizations in Lapland are training their own groups but also training together with the Police three times a year. The Police also training once a year with the Arctic Rescue Guides. They have developed materials for training and SAR that are easy to use. The number of voluntary groups and members has been steadily increasing in Lapland, with about 2000 members in 2018 in the Lapland sector of Voluntary Rescue Service (Vapepa). Vapepa in Finland is a network of 53 organizations whose emergency teams support the authorities when accidents or other crises occur.

Mertala also talked about their search and rescue methods for missing persons where they often cooperate with voluntary groups and other authorities. He gave an example and showed a video of the search method, profiling, and utilizing drones for search. The Lapland Police has invested in advanced drone technology that is used all over Lapland to help with search.

He mentioned that in Lapland, an important resource, especially in the winter, are the Arctic Rescue Guides, who are tour guides in travel companies with good knowledge about the area where they operate. The Arctic Rescue Guide course is arranged once a year for a maximum of 20 students by the emergency preparedness and rescue authorities together with the travel companies in Lapland. Guides will learn about condition safety, wilderness survival, and authority cooperation and coordination. The courses are arranged for new and advanced guides. The courses enable the guides to take part in SAR cases and assist the authorities in search and response. The trainers include the Lapland fire and rescue service, the Lapland Police, and the Lapland health care services. The content of the courses is planned together with the authorities and the travel companies. The guides utilize the Mapitare tracking system, which was developed in cooperation with the tourism industry and is also used by the 112 call center.

4. Summary of group discussions

After the presentations, the groups were asked to discuss the four topics dedicated to the workshop. Each topic had a moderator leading the discussion:



- Robert Brown, Memorial University of Newfoundland for *technological development and innovations*
- Cara Condit, US Coast Guard Academy for *competence development*
- Benjamin Strong, US Coast Guard for *the role of volunteers and local communities in SAR*
- Joe Costello, University of Portsmouth for *network development and cooperation concepts*

The moderators circulated to each group so all participants got to discuss each topic. This chapter summarized the key points from these discussions. The detailed notes can be found from the [Annexes](#).

Technological development and innovations:

During the technological development and innovations discussion, the groups were asked to *define what technology is for them, what kind of technology do they already have that help with their work, especially in SAR and what kind of technology and innovations do they need.*

The groups had very similar ideas of how they define technology. They found it to be some form of hardware or software but felt that there is a need to take into consideration the whole system around the technology, such as the interface, algorithms, methods, and how to use the technology. In order to solve issues with technology, the user needs to understand the technique, application, and how to develop it even further. There should be more training for the use of technologies and it should be age-appropriate. Sometimes application of some technologies can be used for SAR, that was not originally considered for that purpose, such as drone technology. The groups also mentioned that some methods may not be the same in every country.

There is a number of different types of apps available already that can help with early warning, SAR coordination, situational awareness and connecting to the voluntary organizations and assets. The groups mentioned especially few mobile-based apps and connection support devices that can help to provide better situational awareness during operations. People tracking and counting technology during large-scale incidents was also mentioned by a few groups being very helpful and welcome development. Decision-support systems and large SAR experience databases are important for evaluating incidents and learning from them during, before, and after operations. For training artificial intelligence and simulation technology was mentioned as something that helps to prepare for and avoid incidents. Regarding helicopter technology, some participants highlighted that the development of air refueling and longer range helicopters has been critical for SAR operations. The oil and gas and private sectors can also offer a lot of technology that can help in SAR and provide assistance.

Technology is also somewhat limited when it comes to the location and the people who use it. Some rural areas, for example do not have mobile coverage, internet or satellite connection. Battery life can also be poor due to cold weather. The groups agreed that there should be plenty of new technology and innovations however that is always limited by budget. The topic that was brought up the most, was the need for better evacuation technology, including equipment for ship to ship transfer of people, how to get people from lifesaving applications to shore, lifeboats that function better and how to rescue multiple people at a time. Other needed technology and innovations mentioned by the groups, were better situational awareness and communications applications, easy positioning technology, better hydrographic



data to prevent incidents, and better interfaces for decision-support tools. At the same time, there is a need for more training and better understanding of new and old technology.

Competence development:

For the competence development topic, the groups were asked to *define competence, identify gaps and challenges with competence development and come up with best practices and innovations that they might have in their organizations and countries.*

The groups found that competence development and competence in general is often cultural and therefore can have a difference between countries, organizations and cultures. Competence is also often local specific. Professional competence is defined by standards, rules, and regulations, such as IMO conventions. These are complemented by standard operation procedures, incident command systems, and other site-specific procedures and knowledge. Someone mentioned that competence in plain terms is to understand the information in front of you and is applicable to operators, practitioners and volunteers. This involves i.e. technology and equipment, communications, practical response, and other capabilities. Competence also needs to be trained and its maintenance is important.

Some groups also found that competence acquisition and continued maintenance can also be challenging. Some mentioned that there are gaps in competence development due to a lack of information sharing and resource awareness. Some groups noted that there were gaps in regional standards and sometimes communication with local knowledge holders and smaller communities can be challenging. It is important that local and Indigenous knowledge is incorporated into training and education. Also training levels might vary and changes are often dynamic. Other key challenges mentioned were resource availability, cultural implementation, and motivating local volunteers to develop competence, training and learn changing standards and technology.

One of the most suggested best practices for competence development within the groups was to encourage models for industry standards such as AECO has done. There could be programs focused on education for certain areas like there is for Svalbard and Lapland. Referring to the innovative Arctic Rescue Guide course in Lapland, promoting and establishing programs to educate local guides to take part in search and rescue was suggested. In this regard, it is also important to enhance engagement with locals and Indigenous communities. The groups also emphasized that it would be important to increase personnel exchange and joint training- and not just for exercises but for courses and day-to-day training.

The role of volunteers and local communities in SAR:

These group discussions concentrated on three main questions regarding the role of volunteers and the local community in SAR: *what are the best practices and solutions you can bring into the table now, what are the biggest challenges you face, and what do you need to do your job better?*

Each group had participants from different organizations, so each would bring different best practices and solutions to the table for utilizing voluntary and local resources. The voluntary organizations in general noted that they offer the resources, experienced people from various fields, equipment, first response, education, local knowledge, outside of the box thinking, and many other capabilities to SAR operations and preparedness. Someone also mentioned that building relationships and trust within the local voluntary groups is an important best practice. Often volunteers are also dedicated to the task in a



different way than responders who are doing it as their job but also struggle with having multiple roles at the same time.

Someone mentioned that, in general what the authority level is bringing to the table is a proven functional SAR system and solid foundation for coordination. After that it is a matter of putting pieces together under this umbrella. In this regard, authorities are sometimes quite limited to certain tasks and specialty and often have to rely heavily on voluntary assets. It is however important the volunteers are well trained. Some authorities mentioned that they offer education and training possibilities to the voluntary organizations but also to companies who want to utilize their guides as a resource. The authorities also mentioned that policymaking is important, as it is an arena where best practices can be promoted to a wider audience and some necessary changes have to go through the policy level before they can be implemented.

Leveraging operators, and their local equipment and knowledge is a crucial asset to the response authorities. Companies in the table mentioned that they often have private equipment, vessels and well-trained people in the vicinity that can be used in SAR operations. The tourism industry trains their guides for cold weather survival, using snow scooters, driving RIBs, mountaineering, glacier safety, and so on, but miss a good education system to train the guides to take part in SAR operations.

The most common challenge and need mentioned for voluntary organizations and local communities was the lack of equipment and budget to buy necessary equipment, train people, support initiatives, and so on. Small budgets also mean cuts on travel costs, which would be crucial in relationship building joint training and personnel exchanges. Another major challenge is motivating local volunteers to take part in operations and training. In places with a lot of tourists and accidents such as Iceland, volunteers are getting worn out and tired because of the amount of cases per day. Referring to mental health challenges, one group also pointed out that sometimes if there is an incident in the community, the local volunteer responders might also suffer from major emotional distress.

Another key theme mentioned was roles and responsibilities and how to coordinate and manage the voluntary resources in the best possible way. Sometimes roles and responsibilities are not clear to all stakeholders, and the authorities and responders are afraid that volunteers will take chances and are unaware of the risks. Therefore, managing expectations from the beginning and setting parameters were regarded as important, but sometimes that can also be challenging since managing and regulating too much can be harmful for motivation resulting in volunteers to drop out. It was also noted, that often times in bigger incidents there are a lot of jump-in volunteers as well who want to help, however it can be challenging for the authorities from management and coordination point of view, as they are not aware what these volunteers are doing, who they are, how much training do they have, what skills do they possess, and so on.

From the technological point of view, some groups highlighted that there is a gap in communication and a single access point to situational awareness at all levels. There is a need for innovative solutions such as apps, to create a common operating picture, which is accessible for all people involved in response action, and which actually works well and is simple. Few groups also called for better after-action reporting, data collection, and ways to share and implement lessons learned.



Network development and cooperation concepts:

Similar to the other groups, during the network development and cooperation concept discussions, the participants were asked to *define what networks and cooperation means for them, what are the challenges and what needs there are when it comes to developing networks and cooperation.*

Networking and cooperation were regarded as peer learning, understanding different structures, solving issues efficiently, preparing and planning, and connecting with the local network for solving local problems. Someone mentioned that one does not discover the relationship during an incident, you need to know the people before the crisis happens. Therefore, in general the participants classified network development and cooperation as internal and external communication, which is always a positive thing, however there was general frustration towards repetition of the same topics and issues, and the same contacts meeting up in just slightly different fora. There was also a consensus, that there is an exceeding amount of information out, and many different meetings all over the world, and it can get quite overwhelming. It is important to build on existing networks and combine them, instead of building new ones all the time. One of the key questions was, how to bring all the information together in one single platform for all network and cooperation projects. The ARCSAR website and innovation arena were regarded as a good development towards a user-friendly system.

Some also noted concerns about the inconsistent use of language and terminology in SAR for coordinates, time, locations, and so on. One suggestion and objective for this was to find technology for translation that would give universally accepted standardized formats.

Another key challenge that came up during the discussions was retiring or moving responders and workforce, who possess tacit knowledge and best practice, which should be shared with others in the organization. Some participants also noted that there are potential opportunities to upscale the knowledge given the right procedure for that. The participants also recognized that a local approach is needed when developing large networks in the Arctic. Local networks have different kinds of expertise, a more bottom-up approach as they want to solve local problems.

5. Key take-aways

Most key take-aways from the first Innovation and Knowledge Exchange event concentrate on **strengthening the local and voluntary resources and capabilities in the Arctic and North-Atlantic region** especially for large scale incidents and hazards. Participants at this workshop noted that many communities have good capabilities for local response and have organized volunteers with local knowledge and valuable competence from various professions. However, there is still a need to work on developing those capabilities including **purchasing equipment suitable for local communities, training key people from the community to train other volunteers, and developing new technology that would help with coordination, communication and evacuations.** The increase in tourism has led to some increase in workload for rescue teams, therefore **keeping the motivation high within the voluntary groups was highlighted the most during the workshop.**

One innovative approach that was mentioned often during the workshop was to **establish courses for local experienced tour guides to take part in SAR operations,** with an example from the Arctic Rescue



Guide course. Motivating tour operators to cooperate with authorities and voluntary organizations and utilizing all assets in the most efficient way possible would enhance local response.

From the technology side, the participants called **for innovative solutions on the common operating picture**, that would connect all relevant stakeholders in response in a better and simple way. There should also be attention to the entire system of interface, methods and operation around the new innovative technology products. This includes the demand for the efforts to learn how to use this technology so it will work most efficiently. **New innovations for people-tracking** during large-scale incidents, such as the tracking wristband Red Cross has been testing for triage, was regarded as a welcomed development. Someone suggested that this kind of technology could be taken further together with the cruise industry.

Building relationships and trust came up as one of the key themes in the group discussions. Strong relationships, personnel exchange, and joint training were highlighted as crucial best practice, however the participants also noted that this often requires increased travel, budget, and time away from day-to-day life, which can be difficult to achieve. **Simulation training was suggested as a cost-efficient way to joint training and cooperation.** In this regard, different simulation environments could be developed in different countries for better innovation and knowledge exchange between sectors and regions. Innovative solutions such as artificial intelligence technology may enhance knowledge for better analytical decision-making or early warning. Relationships are also built during emergency preparedness and Arctic-related events, whoever there was a general view that sometimes there is **too much repetition** in these kinds of events with the same people, issues and topics, and the participants wished a more focused approach on this.



ANNEXES

Annex 1: Detailed notes from the group discussions

1.1. Technological development and innovations

1. Technology in SAR – what is it? – short discussion
2. What do you have?
3. What do you need?

First table

1.

- Both stuff and also how to use it, and technique how to solve
- Find hardware software
- Technology – whole system around technology, not just stuff - interface, training, authorities,
- Human being, Technology and organization
- Best practices on historical knowledge
- For helicopters – length/ weight, but also knowledge about limitations and opportunity in shipping industry a lot of technology on board, but they don't know how to use it
- There is also an integration of professional technology and clients walk around with technology, combine and integration. Is it used properly? Can it be used more? New opportunities for the technology that exist
- Training - technology
- Mobile telephones have warning systems, these are used, we are starting to think about
- Ships from Kangerlussuaq - no internet, Svalbard areas – the same, minus temperature. phones are not working

2.

- Part of intern COSPAS agreement, PLBs – global coverage
- SPOC – part of the notification system, an important piece of technology in Canadian SAR
- BEACON
- Oil and gas industry – we are actually in the area, northern part of Norway
- Johan Carlsberg, near Bjørnøya – quite soon
- Assist SAR – every installation will have - each vessel has mob boats, no helicopters in the north, but SAR helos in the south, but the majority of the operations relate to the oil and gas operations.
- Helicopter in Hammerfest
- If you find oil and gas in the same area, so it is possible that helicopter will take care of personal transport, and in addition have to comply with regulations, have emergency preparedness. One is “bus”, another is standby, for SAR
- Drilling rigs, all these installations have storages with fuel, they can support national resources in refueling
- And support for radio/communication nodes
- A lot of gear on board – being medical doctor training, tested crew on blood type, - blood bank
- In Iceland system App Rescue Me – send link to the phone of the person in distress



- Another one in the computer
- The Norwegian government will extend HF coverage of the north. It is already there but unstable, may be several days without connection. But satellites all the time

3.

- More different kinds of simulation environments, in every country
- More collaboration – universities and practitioners
- First responders, students, volunteers, anybody
- A gap in understanding what people are taking outdoors, not enough knowledge about the technology we have

Second table

1.

- Everything, hardware, software
- Technology is something physical
- And also data integrate
- And the systems around it – the systems linked together, methods, algorithms
- Some methods may be not the same in the same country
- Methods may lead to different technology because of the differences on how we “do things”
- Methods are also innovation

2.

- F ex technology presented by Finnish RC – to track or counting people
- System for Situational awareness from Meteorology / Norwegian ice service – for forecasting, location, sea ice, ice watch program, trying to bring more in the satellite forecast model
- Large SAR experience database – one is old only with logs, last 10 years we have SAR reports to incidents
- Accessible for actors, but they are making possible to another organizations like RC to have access
- Based on that knowledge JRCC Norway will make an app, decision support data based on previous cases.
- Voluntary rescue teams will have a decision support system in the field
- Other options too – file travel at the same app
- FORF - Database with all resources – national SAR association, every organization is responsible for updating their equipment and resources
- How to avoid incidents? simulation technology gives artificial intelligence technology for decision making, it is in the making especially in oil and gas. It is being developed in the simulation world.
- Simulators can give early warning
- Solutions are available in machine rooms, A lot of data is recorded
- On the new rescue helicopters there is a mobile phone coverage base, they can establish in the areas where there is no mobile network coverage, acting as a relay station.



- And also pinpoints people in the avalanche with mobile phones – you can find people as long as they have phones with them

3.

- ICG – technology up ribs and boats with survivors. Not new, need newer
- Need technology for Evacuation from waters to the ice ridge
- When you are cold, a big problem to get to the ice
- Everybody carry cellphones, with data (from social media?) which can be utilized in decision making – suggesting percentage of possibility to have a heart attack or smth, for ex where police and ambulance
- Use to integrate big data into situational awareness, and do we want it,
- Who is evacuated first? Children on their own, issues of triage
- Better communication links
- Lapland – people we know are there, but about many we don't know that is there
- Need technology equipment to transfer people from ice, rafts, small ships,

Third group

1.

- Electronic technology, then ice information, then academic and scientific technology because we need to understand how to use data
- Construction of technology, stuff, electronics
- Application, implementation
- Drone – application in SAR,
- Technology center in Tromsø (drones research)

2.

- Need passenger tracking system, integrated like Finland presented
- It exists already but
- Short wave radio data
- KYATM (?) Testing new satellite and data transmission system in USA antennas each side of the vessel – will test in wintertime
- CIT – ship-based kites that you can attach radar/antennas
- UK – refuellable capability for helicopters may be useful air to air
- In 18 months ice service will get ground satellite ice

3.

- Need to develop working people to evacuate people from one ship to another, can hoist one/two people by helicopters but can be far away or cannot pick up wounded persons, can be too rough
- Or from ship to the ice
- Opportunity to improve hydrographic data from satellites – related to prevent
- Lifeboats that work – swinging, dangerous to launch, no toilet, people vomit



- Crowdsourcing of hydrographic
- Safety equipment on board can be available as vessels of opportunity
- Regulations for equipment
- Smth that help vessels of opportunity, how to transfer people
- Pilot boats have sometimes smth that can be installed to the deck,
- Investment is the problem"
- Technologies that can suit for handicaps
- VHF radio – that works because the radar is not working

Fourth table

1.

- Everything with power
- IT tools, analytical approaches to the problem, access to the information, forecast
- Data and sensors, satellites
- Things that facilitate me in what I am doing

2.

- Satellites are used less than they could
- More easy info how we can use technology
- Acquired once and why is it not used by others – money or other limitations
- Lack of proper training to use technology
- EVAT: Very simple evaluation tool from Laurea university – electronic, practical app – to be used in training and exercises
- E-learning - operational decision support systems, platform to manage operation (Norwegian Red Cross) – under development, maybe in 1 year
- An app you can download in Norway
- Enrich small phones individual
- Technology that divides into 3 meters squares

3.

- Better training to use tech and satellite data
- More innovation projects, investment to find proper solutions
- Knowledge - Better easier user interface for technological solutions that are there
- More services, more competition
- Better global positioning systems based on radios – that give the exact position of the vessel (radio-based tools in the Arctic)
- Application of the technology
- Many decision-support systems, need integrated one
- Live-tracking of people involved for incident command
- Warning



- Common information sharing platform across the Arctic - of course with data that can be shared in Europe it is this kind of platform Cice
- Technological way of accessing and processing existing data
- (Arctic 365) Need to know and understand what is the main technology to help authorities in searching
- Improve knowledge and training for people who use technology,
- (Arctic 365) Project to put electronics to the skies, they basically scan snow, can put technology in adventure equipment/ backpack
- Improve tech for location, mount inn and improve training for users
- A feedback that the signal is received in the beacon
- Battery capacity – old batteries are used right now

3.1. Competence development

1. Define Competence as:

- Cultural.
- Technological.
- Site-specific knowledge.
- Practitioner response.
- Rules + standards.

2. Gaps/Challenges:

- Lack of info-sharing.
- Resource awareness.
- Training levels/dynamic changes.
- Comms with local knowledge holders.
- Gaps in regional standards.

3. Innovations/Best Practices:

- Personnel exchange + joint training (not just exercises).
- Models for industry standards like AECO or area-specific programs focused on education in Svalbard & Lapland.
- Engagement with locals
- Promotion of program to educate guides.

3.2. The role of volunteers and local communities in SAR

Questions asked from each group:



- *What are the best practices and solutions you can bring into the table when it comes to the role of volunteers and community in SAR?*
- *What are the biggest challenges you face?*
- *What do you need to do your job better?*

Group 1:

What are the best practices and solutions you can bring into the table when it comes to the role of volunteers and community in SAR?

- As an example, in Alaska it would take 24h to get resources, so normally volunteers are the first responders
 - o Local fishermen
 - o Hospitals does not have resource or competence
 - o Relying on the local village
- Red Cross in Norway trying to offer some local resources at least in every community
 - o First aid competence
 - o Basic level training
 - o 6000 active volunteers
 - o Specialized training in SAR as well
- Policymaking level, where best practices can be promoted
- Vessel of opportunity can be a volunteer or someone in the vicinity
- Outside the box response thinking
- Responsibilities have been established on the national level
- Underline the benefit of the tourism
- Utilizing tour companies who do guiding, they have boats and other equipment, but miss a good education system for guides
- Non-response agency can usually have local knowledge and equipment
- Leveraging operators, their equipment and local technology
- Red Cross is educating volunteers to lead SAR operations

What are the biggest challenges you face?

- A challenge that the local community at least faces from cruise tourism are the increasing visitors in small communities and their behavior
- A challenge in motivating local people to join the rescue operations
- Need to adapt to a way of doing things at the villages and cities
- A good point of contact is needed locally
 - o Network on resources locally but who to contact and who will coordinate?
- People living in rural districts want to help
 - o The challenge is the communication, contacts and using the right people at the right time
- Policy challenges, from policy perspective setting the baseline is sometimes difficult
- Need to improve the engagement of the local community, what the tour operator is doing, if volunteers don't see the benefit they will not help
 - o Building trust and good relations is the key, if not good relations with them



- Gaps from a technological point of view, what's needed is a single access point to situational awareness and system at all levels,
 - o Availability and the situational awareness in the area, but also forecast
 - o Needs to be accessible for all of the people involved in the action
 - o For example an app
 - o A common operating picture that actually works
- Record lessons learned
- A small budget is always a challenge

What do you need to do your job better?

- Communication
 - o Always a problem
 - o Really good comms in the Arctic doesn't really exist, close to shore especially difficult
 - o Cannot coordinate everything smoothly if there is no common operating picture
 - o In the US, they have a system where they can ask citizens to send pictures and video etc.
- Trust building is difficult to achieve
 - o There is no training on how to build trust
- Common work culture building
 - o Culture of thinking that volunteers and tour operators can support response agencies
- Funding and money what is the first thing that is needed
 - o In order to get more equipment and more training for people

Group 2:

What are the best practices and solutions you can bring into the table when it comes to the role of volunteers and community in SAR?

- We have many people and volunteers
- Knowledge is important
- ICE-SAR and RS commented that they struggle with multiple roles
 - o People have multiple hats for everything, 4 jobs for 1 incident
 - o In Iceland they have a strict rule, do your job, get paid for it, otherwise volunteer, then follow the rules from the voluntary organizations, always work under the police
 - o ICESAR can dictate also policies, defined responsibilities
- Norwegian Coastal Administration commented that they have a lot of equipment and ships around, but they also have a lot of people who are trained sailing on the Norwegian coast, they have good knowledge and training with the coast guard but also with the oil industry and pollution response
- Private equipment from the oil and gas industry, they also have agreements with fishing fleet and other vessels, in case of an incident and an oil spill
- Prevent things from happening is the key
- Lapland university of applied sciences commented on behalf of the tourism industry in Lapland, the industry and guides have a lot of skill and skilled people who go around in nature, they know the rules and difficult places, they have a lot of equipment, snow scooters and other, can survive in the cold climate



- In US Coast Guard, they don't have a mechanism in place to connect to tour operators

What are the biggest challenges you face?

- With volunteers the authorities don't necessarily know what skills they bring to the table
- They could be the most experienced
- For volunteers it could sometimes be difficult to make triage and prioritize people
- Local knowledge with unproven skills
- Places with a lot of tourists, volunteers are worn out because of the amount on cases and tourists, at one point they refused to help because they were too tired and had their 5th operation,
- Not so much technology in the area
- A balance between too many tourist and not enough people
- With volunteers, the authorities and responders are afraid that the volunteers will take chances and are unaware of the risks, for example crevasse rescue but are not aware of the dangers that crevasses and glaciers have for the responder
 - o Pushing out of the comfort zone
 - o In ICESAR training, they train to not go out of the comfort zone
- Mental health effect on volunteer responders
- Iceland Red Cross mentioned spontaneous volunteers during the tsunami in north Greenland, Danish navy had done much work, the people could not go back to their homes, they had to make people volunteer, when working with indigenous and first nations sometimes you don't always know the culture, language, and motives. A need to be aware of this!

What do you need to do your job better?

- Money is the first thing
- Sea rescue associations need bigger ships and more equipment
- Rescue ships on the coast
- More cooperation with coast guard and rescue team, networking and also practice
- Oil and gas industry commented that they have the equipment but need to enhance it
- People are also changing in times of age, weight and so on
- RCC in Canada said that the view could always be better, communications and coordination for the nation
- From the academic side, we could look into how well do we report incidents to make analysis
 - o More sharing of data
 - o TTX and gathering certainly help to engage people and identify challenges, lessons learned
- Mandatory debrief
- Short after-action reports

Group 3:

What are the best practices and solutions you can bring into the table when it comes to the role of volunteers and community in SAR?



- FORF commented that they have the best rescue service ever, local sites, they are nearby, they know the area, you have trust and trusting relationship with first responders, know how to manage them and use local knowledge
- ICG has very good experience with SAR organizations. It is mandatory in local communities, they rely heavily on ICESAR
- SAR-EYE in Iceland is used for SAR incidents and volunteers to monitor the incident and give the location to volunteers, it's an app
- Important to use locals when organizing SAR in a remote area, they know what to do with the weather and cold climate response for example
- Authorities are quite limited to certain tasks and topics and specialty in something, volunteers are not technically as good, but some of them are really experienced
- People have several hats
- Dedication is important and volunteers often have it, as comes from another source than just "doing a job"
- Many times there are also volunteers that are not trained. Can be an asset but also a burden, and it needs to be managed
- A lot of bystanders, they want to but don't know how to help, voluntary organizations often deal with different kinds of volunteers so they know how to do that

What are the biggest challenges you face?

- Coordination of all-volunteer resources
 - o Different voluntary organization
 - o Difficult to coordinate large groups and all individual volunteers
- Challenge, if the incident is happening in the local community and the volunteers are in emotional distress
 - o Have a solution to the challenge, ability to bring people from other areas/communities and outside, come in to provide support for both the volunteers and the other local community
- From the ice services perspective, locals having enough ice information is a challenge, getting the information to them, sometimes have to talk them through on the phone
- Governors office perspective, every accident will happen in the municipality, make contact and agreements with the voluntary groups, having a specific plan is sometimes a challenge
 - o i.e. the Viking sky accident, the local community can be help with stuff like food, they didn't have a plan for it but it worked
- Budget is always a challenge
 - o Cutting travel, they cannot travel to learn, relationship building, building the relationship with the local community and knowing everyone is important

What do you need to do your job better?

- Voluntary organization do not have enough money to buy the equipment
- Need more radios and other equipment for voluntary organizations
- In Finland especially with volunteers, they want to do the job, and they do it well, but the reporting is not so good
 - o On HQ level you need the reporting, improved after-action reporting
 - o Before actions as well, mapping the current capabilities



- In many situations voluntary organization will be the first responder, and giving situational awareness, improving situational awareness, digital sharing, but also other equipment and knowledge on how to use the equipment
 - o A lot of the volunteers are old people, which is a challenge with new and evolving technology
- Data collection and data sharing, providing situational awareness
- On the radios, there should be a window where you can scroll down and see what has been going down and what has been done
- Good citizen science network and sharing that data
- Telemedicine

Group 4:

What are the best practices and solutions you can bring into the table when it comes to the role of volunteers and community in SAR?

- Proven SAR system in general
 - o Solid foundation
 - o How can we put the pieces together under this umbrella?
- For Svalbard, there is a very big difference between the land-based and marine-based SAR
 - o Land-based is totally depending on the local community for SAR
 - o For marine, the local community is only to take care of the patients/passengers/crew when they come to land
 - o They provide a major help, and they are good with it because that's where they live
 - o A strong relationship with the local SAR operators
- ICE-SAR has a rescue school, where they are training volunteers

What are the biggest challenges you face?

- Roles and responsibility
 - o See it as a benefit and also a challenge, because the roles and responsibilities are not always there/clear to everyone
- Managing expectations from the beginning and set parameters from the very beginning
 - o If not done properly, can end up in a worse situation to start with
- UK has RNLI, but also CG auxiliary, 400 volunteers,
 - o standards vary hugely if clear parameters aren't sent they get into dangerous behavior, they accept the responsibility that they shouldn't
- If you over-manage and regulate too much, they leave and lose motivation, but if you don't do it, they get into dangerous situations
 - o Motivation is a big challenge
 - o Striking the balance is the critical element
 - o I.e. a fishing trawler sank, local divers went to help, two of the diver died because they were too keen and took too much responsibility
- Expectations is a challenge, to what extent they are supposed to go and what they are supposed to do
- Training provides knowledge and the other thing that provides knowledge is experience, over-trained but under-experienced people



- LThe local community in a wider perspective, even if not SAR per se
 - o There might be people in the community who know how to rescue and do CPR training, using the people in the local community and the benefit outside of the SAR community and SAR case
- Local knowledge, they know their land and ice, it's a benefit that you need to tap into
- Three years ago, MRCC Bremen had a workshop with a professional and voluntary rescue crew, the professionals learned more from volunteers than the volunteers learned from professionals
- Volunteers have deeper motivation sometimes than the professionals
- Relationship and respect is important
- Unmanaged volunteers, people who are offering their houses and food, compassion, post-rescue, it's not necessarily a big challenge but it's a challenge with locating people afterward
 - o I.e. A cruise ship in distress in Falkland islands, passengers ended up in houses, tried to work out where everyone was. It took 24h to locate them, further 48h to get them back again

What do you need to do your job better?

- Training experience and shared training
 - o The industry is not sharing technical problems, but everybody wants to share training, procedures are also shared from the industry
- Building the local capacity that the trainers are in the community, training doesn't come from the south
 - o Building the training capacity in the local community
 - o Takes time and money
- Managing expectations of the community
 - o What is the capability of these communities and volunteers
 - o Crucial to finding key persons for the local community, key person to make it attractive to join the volunteer communities
- Need a lot more people to manage and support the community and response
- Keep the people trained, motivated and ready to go
- Need budget and fiscal commitment to robust programs
- Culture of giving money to voluntary organizations
- Cutting travel budget is a problem

3.3. Network development and cooperation concepts

Table 1:

- Definition
- State of the art
- What do you need?
- So many forums and so much information, we are traveling the whole autumn between different networks, a lot of duplications.
- How to puzzle together the information – this is a challenge
- Build on existing networks and combine networks



- One single platform for all networks and cooperation projects
- Fewer countries in the Arctic then elsewhere – same people meeting each other in different arenas
- Large network – international – national and local
- Operational networks – situations that you are not familiar with – how to bring in expertise – working in complex networks of different expertise – how do you run it and make it effective
- Standards in certain places could help – it should be done the same way, so you can integrate if something big happens
- We need to capture the outcome – knowledge and information that are created in these networks – what kind of information can we bring to our policymakers
- The information needs to be focused
- What to share and with whom
- ARCSAR could be one-stop-shop
 - o Arctic procedures, standards, etc.
 - o An Arctic umbrella, for ARCAR, Volunteer groups, ACGF, EPPR
- ACGF, EPPR/Arctic Council – cooperation between these organisations
- Lack of institutional memory causes loss in information and the same exercises will go over and over again – this needs to be captured systematically
- Easy system to capture this
- ARCSAR IA and webpage could meet some of these needs
- Sustainability beyond the lifetime of ARCSAR project
- Use of AI to categorise and make use of all these reports in the Arctic SAR-field
- Large group with a lot of institutional memory (NIS) on sea ice issues – volunteering their own resources – creating a long term working group – similar or under Arctic council
- A website that collects all the websites – and are active
- Find out easily who are you going to get in touch with within a specific area
- How to use this for prioritizing areas to work on?
- A database for mapping the SAR capacities of all Arctic nations – someone has to update and maintain this overview
- Database on publications with keywords

Table 2:

- Small organisations need to connect with industry – this helps them reaching a higher level – important to be bottom-up
- What does it mean?
 - o Peers, learning
 - o Understanding different structures, mainly internationally
 - o Clients/users and learning, end-users
 - o Solving issues, efficiency – talk to someone with the solution
 - o Preparing and planning, not reacting. Prevention.
 - o Important with the local network for solving local problems. Which vessels are in the area, who can assist, local knowledge on who and what is available. Totally regardless of your field.
 - o In order for the network to work – clarity on what you are going to share, why. Agreements.



- You don't discover the relationship during an incident, you need to know the people before the crisis
- We are operating in small communities and large distances; you need to know who is in the area – local knowledge
- What is the perfect scenario?
 - o We need a repository for all great ideas/lessons learned
 - o Different procedures, ideas, etc.
 - o Accessible and user-friendly
- There are so many groups – duplications
- Benchmark – to avoid
- Time-limited projects – the work disappears
- Legacy/Value in moving forward – an extended lifetime for the projects
- Consistency in terms and language – could be obtained by a repository
- To work in partnership, not a customer relationship/transactional
 - o All of the transactions works better with the customers, when we are in a partnership
- People move – keep corporate knowledge, but networking and contacts should be transferable – sustainable

Table 3:

- Internet/radio communication – SOP – even if you have guidelines – things are still not working – SOP need to be rephrased
- Radio communication – guides and helos have different pictures – should train together – not possible to train all of the guides but maybe through a network
- Radio terminology and standards
- Technical communication – are we on the same frequencies and platforms? Not always. We don't always have access to the same systems, due to regulations (GDPR)
- Even if I don't work with SAR – but need to have the latest information and giving it over to relevant users – where can I find it, and giving the relevant information/meeting
- How do I reach my target audience –
- Repositories – somebody has to take care of the security/governmental issues
 - o If not, the information is just superficial (diplomatic issues)
 - o Need governmental support – top-down
- Working on the satellite coverage, band-width – it is difficult for a non-Arctic country to get confidence from the Arctic community. Some technical competence does not have any geographical limitations – transfer knowledge to all of the regions. Technology is already out there – the Mediterranean.
- Communication between different resources and also in between the resources, different language/terms between the different resources.
- Standardisation/universal for overcoming the problem?
- Babelfish! / google translate

Table 4:

- Ship safety – is there too much communication?



- Bottlenecks – there are too many sources – radio, e-mail, twitter, etc.
- Keyword – situational understanding from the RCC – to the ground
- To establish the situational understanding, film, video, etc. effective information
- Liaisons – someone who talks the same language – that can explain and translate
- International communication according to the IAMSAR manual – important that they are being used. They are not for free – you have to buy it. The end-users don't have it. They should be available for everyone – standardised
 - o You still have to learn it
 - o Training/video
 - o Adults would like to have short text, pictures, movies, user-friendly and intuitive
- When to talk and when not to talk – example on-air control – counting people
- Restriction on how many on the radio for instance – another issue on the common situational awareness
- The local approach is needed – including a different kind of expertise. Local people want to solve the local problems – more bottom-up approach –multi-sectoral teams to cooperate and share knowledge –
- Triple helix – academia, industry and government
- Corporate knowledge - how to maintain this?
- Retirement – losing a lot of experience – all the special small details – lessons learned – experience databank – categories (ship hoisting etc.). This is not a reporting system – a much lower level – nice to know – operational meetings where we go through these cases. Some of these experiences go into manuals/SOPs etc.
- Repository for key information – knowledge database
- Culture of both reading and writing
- For people to read, you need small units so the information is relevant – you cannot send to 20,000 persons – avoid spam and over-communication
 - o Selected, target audiences
- Develop a culture for knowledge sharing and quality assurance etc.
- Language – too complicated sentences etc. (use of bad English)
- Communication can also be counterproductive
- You can use other RCCs for translation the distress signal