

# SDWG Progress Report to SAOs Syktyvkar, Komi Republic, Russian Federation 26-27 April, 2006.

2006

## Sustainable Development Working Group (SDWG)

Sustainable Development Working Group (SDWG)

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# **Arctic Information and Communication Technology Assessment (AICTA)**

## **Proposal and Rationale**

*Presented by  
The Arctic ICT Network  
Drafting Committee*

*For the  
Arctic Council's  
Sustainable Development Working Group  
March 15-16, 2006  
Salekhard, Russia*

## Contents

<b><i>Executive Summary</i></b>	Page 3
<b>Part I: Arctic Information &amp; Communication Technology Assessment</b>	
Background	Page 4
Purposes and Objectives	Page 6
Feasibility	Page 7
Rationale	Page 10
Participants	Page 11
IPY Opportunities	Page 12
Possible Content of an Arctic ICT Assessment	Page 13
1. Governance Issues	Page 15
2. Human Dimensions	Page 16
3. Infrastructure	Page 17
4. Application Development	Page 17
5. Arctic Council Internal Network and Uses	Page 17
6. Case Studies	Page 18
Methodology	Page 19
Information and Data Sources	Page 19
Management	Page 19
Languages	Page 20
Financing and Budget	Page 20
<b>Part II: Development of Practical ICT Projects</b>	Page 21
Conclusions	Page 21
Appendix A: Sample of Resources	Page 23

## Executive Summary

The overall goal of the proposed assessment is to determine how Information and Communications Technology (ICT) can increase the human and social capital in the North, contribute to northern economic development, and improve the quality of life in the Arctic. These goals correspond with the goals of the Arctic Council in order to support the sustainable development in the Arctic in social, economic and environmental issues.

- Can an Arctic ICT Assessment be conducted?
- Should an assessment be conducted at this time?

Both of these questions can be answered in the affirmative. There is considerable experience with conducting assessments in the working groups of the Arctic Council. This would be the first major assessment conducted by the Sustainable Development Working Group, which would hope to benefit from the experience of other working groups.

There are two notable differences between an Arctic ICT Assessment (AICTA) and other ICT studies:

- There is no existing study that focuses on the collective nations and the area of the Arctic for ICTs. There are individual case studies for some specific countries. The data for the Arctic region is included in other worldwide studies, but not analyzed from an Arctic perspective.
- The AICTA study will not focus only on the technologies and infrastructure of ICT as so many other studies tend to do, but will also connect ICT to the other sectors of social, economic and cultural activity important and significant to the Arctic peoples and nations.

The assessment could be organized according to the model whereby the member countries would agree on lead countries to take responsibility for one or more chapters of the assessment. Interdisciplinary author/researcher teams from across the Arctic would be nominated to prepare the chapters. One or more editors-in-chief would be retained at the appropriate time to consolidate the chapters into a final, publishable report. Data would be collected so comparison could be made with similar ICT data collected by other international studies such as those sponsored by the International Telecommunications Union (ITU). This will allow for comparative analysis with other world regions and provide a common baseline for future assessment.

The proposal to conduct an Arctic ICT Assessment is timely. Arctic ICT is central to the efforts of the Arctic Council and its working groups. It is also a critically important factor in human development, scientific research and creating economic opportunity in the Arctic. As with other assessments, AICTA would be based on an examination and analysis of currently existing information on ICT in the Arctic. *The data exist. The study is feasible. It needs only to be done.*

## **PART I:**

### **INFORMATION & COMMUNICATION TECHNOLOGY IN THE ARCTIC**

#### Background

The Senior Arctic Officials in their *Report to Ministers* in November, 2004, noted:

“The 2003 World Summit on the Information Society identified a common desire and commitment to build a people-centered, inclusive and development-oriented information society where people and communities can achieve their full potential in promoting sustainable development and improving quality of life.

“In discussions on information and communication technology in a global context, there is a need to bear specific regions in mind. This includes the Arctic. Small remote communities, long distances and a general lack of effective infrastructure and communication characterize life in most of the circumpolar region.

“Information technology can be an extremely valuable tool and a major contributor to sustainable development, capacity-building, human health and welfare in the` region. For this reason, it is essential that residents in the Arctic be given access to cost-effective telecommunications systems with sufficient carrying capacity.

“It is against this background that the Arctic Council has begun to explore ways and means to improve basic ICT services in the most rural areas of the Arctic, particularly in support of education and health services. The 2002 Inari declaration recognizes the usefulness of ICT in circumpolar capacity-building. In addition, ICT as a tool for development in the Arctic was one of the priorities of the Icelandic Chairmanship of the Arctic Council. The Chairmanship hosted a conference devoted to ICT in the Arctic in Akureyri, in October 2003. The conference focused on three main areas; ICT infrastructure, distance education and telemedicine. The conference concluded, among other things that, that the lack of basic ICT services in the most rural areas of the Arctic prevented residents of the region from developing their full potential.

“In addition, an international telehealth conference entitled: Innovation and Evaluation, was held in Anchorage, Alaska, on 4-5 March 2004, building, among other things, on the results of the Akureyri conference.

“The Arctic Council Sustainable Development Programme provides a platform for the Council to actively explore issues relating to the improvement of economic

and social conditions in the Arctic as a whole. This includes the use of information and communication technology in the Arctic.

“Cooperation with a number of actors is imperative for developing ways to increase the use of and access to ICT in the Arctic. The Arctic Council has cooperated with the Northern Forum, the Standing Committee of Parliamentarians of the Arctic Region (SCPAR), the Nordic Council of Ministers and the University of the Arctic, among others. In the future, increased cooperation with the private sector will also be necessary.” [ at pages 8 and 9]

Accordingly the SAOs recommend to Ministers, among other things, to

- *“Maintain the issue of ICT on the Arctic Council Agenda under the auspices of the Arctic Council Sustainable Development Working Group with the aim of sharing information on best practices and promoting ICT initiatives in all relevant fields.”*
- *Welcome the U.S. offer to host a scoping workshop to consider appropriate future ICT activities, drawing on, among other things, the ICT activities identified by the ICT network included in Annex 1, and ask the workshop to report to the SDWG.*

At the Washington ICT Workshop in February 2005 U.S. Federal Communications Commissioner Kathleen Abernathy provided an important perspective on ICT in the Arctic:

“When I first heard about broadband a few years ago, I was tempted to think it just meant faster e-mail – which is nice, but not particularly earth shattering. But now I know that the potential benefits are immeasurable. It is increasingly clear that broadband technology is fundamentally reshaping the way each of us communicates, the way we work, the way we learn, the way we receive health care, and the way we are entertained.”

\* \* \*

“These technologies are revolutionizing our societies and helping to close the ‘broadband divide’ that exists within and among our countries. But these beneficial effects will be stunted if licensing and regulatory frameworks impose artificial barriers and disincentives to investment. So it is up to each country’s regulators to adjust, alter or reform the old regulatory codes, and to dismantle unnecessary rules that may have been appropriate when markets were dominated by monopolies but may no longer make sense in light of innovation and competition in a converged environment....”

\* \* \*

“The era when “plain old telephone service” defined a country’s telecommunications development is rapidly receding. Today, regulators around the globe... are focused on how to promote broadband deployment to all their citizens. The policy issues regulators face are remarkably similar no matter the

size of the country. And the issues become even more complicated when dealing with very rural and remote regions, such as the Arctic....”

To be able to make sustainable, realistic and concrete plans for fostering ICT development in the Arctic, an assessment of the current ICT situation was recommended to the SDWG by the Washington ICT workshop.

At its meeting in Moscow in April 2005, the SDWG acknowledged the report from the Washington workshop. The SDWG welcomed the offer from Finland to host a scoping workshop to elaborate on the idea of an Arctic ICT Assessment and other concrete ICT projects. Finland hosted the Arctic ICT Network Workshop in Ylläs, Finland on September 7-9, 2005. More than 30 experts and government officials from seven Arctic countries and the United Kingdom participated in the workshop, which was organized by the University of Lapland and the Kemi-Tornio Polytechnic.

During the Ylläs workshop participants developed a plan for the proposed assessment and agreed that it should be extensive and cover all member countries of the Arctic Council and include an in-depth gap analysis and recommendations for future actions. The feasibility of undertaking practical, focussed projects in addition to an assessment was also advanced as an important dimension of Arctic ICT. Such projects could be developed and put forward for approval in accordance with the Arctic Council Rules of Procedure and the Sustainable Development Terms of Reference.

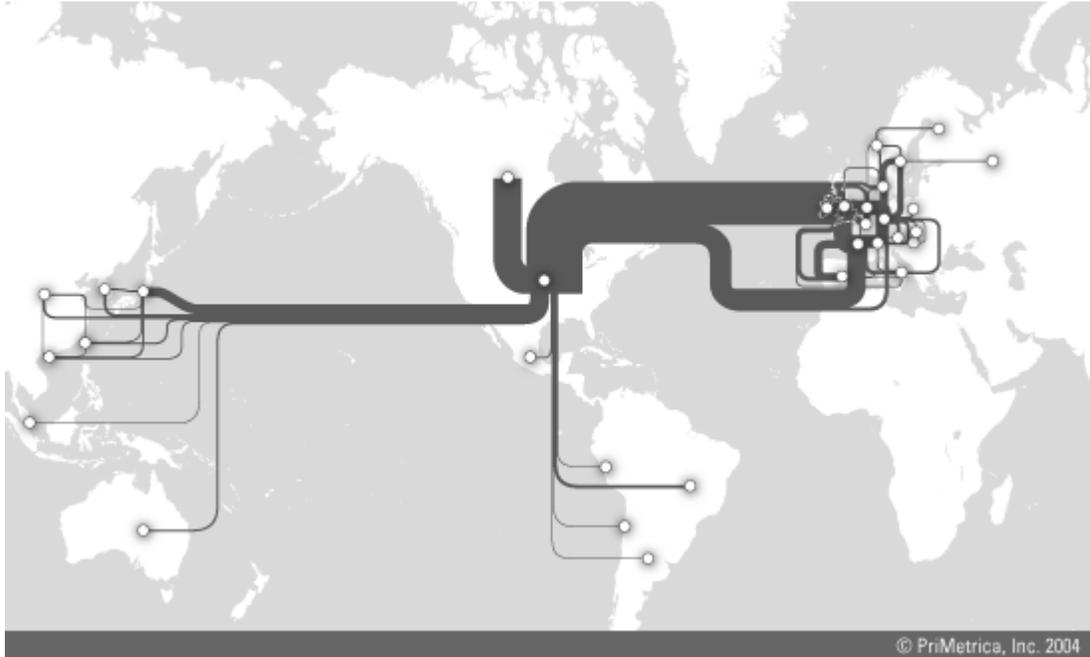
### Purposes and Objectives

The overall goal of the proposed assessment is to determine how ICTs can increase the human and social capital in the North, contribute to northern economic development and improve the quality of life in the Arctic. These goals correspond with the goals of the Arctic Council in order to support the sustainable development in the Arctic in social, economic and environmental issues.

Parallel to the importance of raising awareness in environmental change and its impacts (e.g.ACIA), the AICTA is seen as a key baseline report for decision making and development in the Arctic. Description of the status of ICT in the Arctic could display the gaps and lost opportunities as well as new opportunities and thus influence international financing, both in the regional development work and in various R & D programmes. The assessment could also help in creating criteria for well functioning ICT to support the people living in the Arctic.

The flows of Internet traffic among Arctic nations are miniscule compared to North American-European-Asian traffic. What is the significance of this limited connectivity for development in the Arctic? Can these traffic flows be equated with railway or air or sea traffic and the economic development and well being of a region? These are questions the assessment will address.

Figure 1: Map of Major Internet Interregional Routes, 2004



Notes: Map includes international routes with at least 5 Gbps of aggregate capacity. Figures represent Internet bandwidth connected across international borders to each country. Domestic routes are omitted. Data as of mid-2004.

Source: TeleGeography research

PriMetrica, Inc. 2004

However, what is possibly more significant is the very limited capacity for transmission of information across the Arctic. Information is critical to development, and thus the tools and networks that provide access to information are also vital to the development process. The assessment will review research on the role of ICTs in socio-economic development to determine what impact ICTs could make to developing sustainable Arctic economies.

## Feasibility

Two primary questions that need to be addressed are:

- Can an Arctic ICT Assessment be conducted?
- Should an assessment be conducted at this time?

We believe that both of these questions can be answered in the affirmative. The Arctic ICT workshops in Washington, D.C. and Ylläs, Finland have demonstrated that preparation of an Arctic ICT assessment is feasible and desirable. As with other assessments, an ICT assessment would provide a solid basis for future policy discussions by the Arctic Council as well as a foundation for planning and implementing practical projects. As the Ylläs workshop demonstrated, there is an active interest in conducting such practical projects at the same time as an assessment proceeds.

There is also an important linkage between AICTA and the development of an Arctic portal. The creation of such a portal is primarily a technical exercise based on software design and deployment. However, the portal exercise is already generating a range of important questions in relation to culture, language, local needs, regulatory regimes., etc. It is in the exploration of such questions that an ICT assessment can provide considerable value.

ICT assessments of the technology infrastructure have been conducted for other regions as well as worldwide by other organizations, notably the International Telecommunication Union (ITU) as well as national studies. These studies can be used to provide:

- Source material for an AICTA
- Suggested format and content for an AICTA
- Comparative data from other regions.

There are two notable differences between an Arctic ICT Assessment and other ICT studies. First, there is no existing study that focuses on the collective nations and the area of the Arctic for ICTs. There are individual case studies for some specific countries. The data for the Arctic region is included in other worldwide studies, but not analyzed from an Arctic perspective. Second, the AICTA study will not focus only on the technologies and infrastructure of ICT as so many other studies tend to do, but will connect ICT to the other sectors of social, economic and cultural activity important and significant to the Arctic peoples and nations.

Again, there have been many important monographs and limited studies of a specific nation or region in the Arctic that examine ICTs and one or more of these socio-economic or cultural topics, but **none** that examine the Arctic as a distinct region. There have been studies of developing regions in Africa, Asia, and Latin America, but not of ICTs and the Arctic as a region.

As to whether it should be done at this time, consider the following:

- In 2004, Iceland had 164.01 telephone subscribers per 100 residents; Canada had a national average of 110.99 (although a lower number in the North), Greenland had 79.85
- Russia more than doubled the number of cellular subscribers during 2004 to become the largest mobile market in Europe, but the vast majority of subscribers are located in large urban centres
- However, broadband access remains very uneven in the Arctic, with some communities having access in homes and businesses, others only in schools and community centers, and others have no broadband availability at all.

Globally, by the end of the decade:

- 14 billion computers will be connected to the Internet

- Very inexpensive personal computers could be available
- Your mobile phone will become your computer

The technology is rapidly changing and converging, allowing us to conduct our lives – in commerce, in government, in education, in health, in social services, in science – in fundamentally different ways locally, nationally and internationally. The opportunities and liabilities these changes present to sustainable development for the peoples of the Arctic can be addressed in the assessment.

In the recently published *Connected Series* by Cisco Systems, a number of salient points are offered:

- “Now is the time to broaden the e-government project so that it contributes to the modernization of government, the transformation of the public sector, and the development of new models of citizen participation and engagement.”  
-- *Connect Republic: Changing the Way We Govern*
- “Education has always been one of the primary drivers for economic growth, peace and prosperity. Increasingly we are living in a Knowledge Society, in which connectivity allows us access to all kinds of information at unprecedented speed and in multiple formats ... The vision for the future of the connected school is perhaps best summed up in the essay by French Minister of Education, Francois Fillon, when he predicts: ‘The school we want for tomorrow will be integrated into its local and international environment and open to the world, to its history, geography, cultures and people. It will be a school that facilitates dialogue between the generations, cultures and pupils themselves.’ ”  
-- *Connected Schools*
- “The advent of the internet technologies with the capability to increase access to information, facilitate rapid communications, reach remote locations – is giving clinicians, managers and politicians concerned with healthcare the opportunities to manage and provide care faster, at lower cost and higher levels of convenience for their patients.”  
-- *Connected Health*
- “There is a very important role for governments to play in creating the right environment for broadband to take off, in particular through policies that promote infrastructure competition (like unbundling the local loops, both for telecom operators and cable TV network operators) and through policies that promote inter-modal competition (for instance, through technology-neutral regulations.)”  
-- *Connected Homes*

It is also an auspicious time to undertake such an assessment as the world recognizes the International Polar Year in 2007 and 2008. This assessment would be published in the midst of the IPY.

## Rationale

The proposal to conduct an Arctic ICT assessment is timely. Arctic ICT is central to the efforts of the Arctic Council and its working groups. It is also a critically important factor in human development, scientific research and creating economic opportunity in the Arctic. As with other assessments, AICTA would be based on an examination and analysis of currently existing information on ICT in the Arctic. The assessment could also be used as a market survey that would then lead to the promotion of the region, and as a subsequent step, a search for technology investment in the Arctic.

The acronym “ICT” gives us guidance for the conduct of the assessment: the exercise should be not viewed an effort to catalogue the “technology”, which is clearly advancing very quickly. After all, the “T” is the last of the letters in the acronym. Rather the intention is to focus more on the “I” and the “C”, namely the information and communication dimensions. Technology issues would be addressed as required in the sections of the assessment dealing with the infrastructure. The focus in the infrastructure section will be on current and planned access to various technologies that are considered critical for current and future delivery of information and communication services in Arctic regions. A further focus will be on policies that determine access, i.e. availability, pricing, and permissible services.

The *Arctic Climate Impact Assessment* demonstrates that the planet is undergoing a period of significant climatic change. Additional bandwidth and connectivity will be needed to support the collection and transmission, if not analysis, of increased amounts of environmental data captured by thousands of un-manned devices. Existing data collection is handicapped by an inability to transmit data to remote collection points (e.g., satellites) without significant power sources, which are difficult to maintain over time.

There is also a need for coordination and integration of First Responder communication systems. Interoperability of E911 and other first responder notification and communication systems is both a national and international issue. Given the climatic and geographic extremes of the Arctic region and the scarce emergency responder resources which must cover vast regions of ocean, ice and land masses, it is particularly important that limited national resources be leveraged internationally through joint strategic planning, shared responsibilities, and effective coordination on a day-to-day basis.

The assessment is also timely as the transition to digital television is releasing significant amounts of spectrum for reassignment in many nations. Not all of this bandwidth is being reassigned to the existing broadcasting industries and now is the time to take advantage of opportunities to influence how that spectrum can be reutilized to increase broadband connectivity in rural areas of Arctic nations. (For example, see the [Digital Future Initiative](#) of the New American Foundation.)

In addition to satisfying user needs, the nations of the Arctic could achieve noticeable efficiencies, such as:

- Operational efficiency improvements
- Program effectiveness and service delivery
- Reduction in business risk
- Increase in ICT awareness and training
- Expansion in stakeholder collaboration.

The digital revolution is driving opportunities that Arctic Council nations can take advantage of, such as:

- Economic Opportunities
  - Online trade market for regions to better manage supply and demand throughout the Arctic
  - Market and sell products worldwide
  - Outsourcing opportunity from the globe
- Learning Opportunities
  - Online access to news
  - Online and CD based learning on different topics
  - Access to online books and encyclopedias
  - Games and recreation
- Health Opportunities
  - Online access to medical information
  - Access to health training
  - Tele medicine
- Social and Cultural Opportunities
  - Connecting individuals and communities for cultural purposes
  - Maintaining and enhancing cultural and linguistic resources.

## Participation

The Arctic ICT Assessment should be open to and encourage direct participation from across the Arctic Council network, including:

- Arctic states
- Permanent Participants
- Observers
- Working Groups and other bodies (CAFF, PAME, AMAP, ACAP, ACIA, SDWG, EPPR)
- Expert groups (e.g. ICTN, etc.).

The assessment should also provide for appropriate consultations and input from:

- Arctic residents
- Private sector stakeholders
- NGOs working in the North
- Universities and research institutes.

The intended audiences for the assessment would be all those who are interested in the Arctic and those who live there. The political decision makers, headed by the ministers of the Arctic states and permanent participants of the Arctic Council and the Senior Arctic Officials, will form the core of the political audience who will benefit from the results of the AICTA.

The people living in the Arctic will benefit from the information gathered, analyzed and disseminated by the AICTA process. Regional authorities and local decision making bodies, together with NGOs and educational and research communities will also gain from AICTA. The business sector, especially the ICT sector (e.g., service providers) will have access to broader database of information as a result of AICTA.

### IPY Opportunities

The International Polar Year (March, 2007 through March, 2009) provides a complimentary focal point and series of activities for an Arctic Council ICT Assessment. In prior IPY years, a legacy of infrastructure and organization has survived far beyond the specific IPY observation year. The IPY is also an opportunity for research, review and reflection on the polar region.

On three occasions over the past 125 years scientists from around the world banded together to organize concentrated scientific and exploring programs in the polar regions. In each major thrust, or “year,” scientific knowledge and geographical exploration were advanced, thereby extending understanding of many geophysical phenomena that influence nature’s global systems. Each polar year was a hallmark of international cooperation in science. The experience gained by scientists and governments in international cooperation set the stage for other international scientific collaboration. International scientific cooperation also paved the way for several political accords that gained their momentum from the polar years. IPY 2007-2008 will expand upon this legacy of scientific achievement and societal benefits.

A stated goal of the coming 2007 IPY is the collection and free sharing of data concerning the polar region. ICT will play a critical role in that data collection, analysis and dissemination. It seems natural to explore joint opportunities and collaboration between an Arctic Council ICT Assessment and IPY activities that emphasize research and public sharing of information.

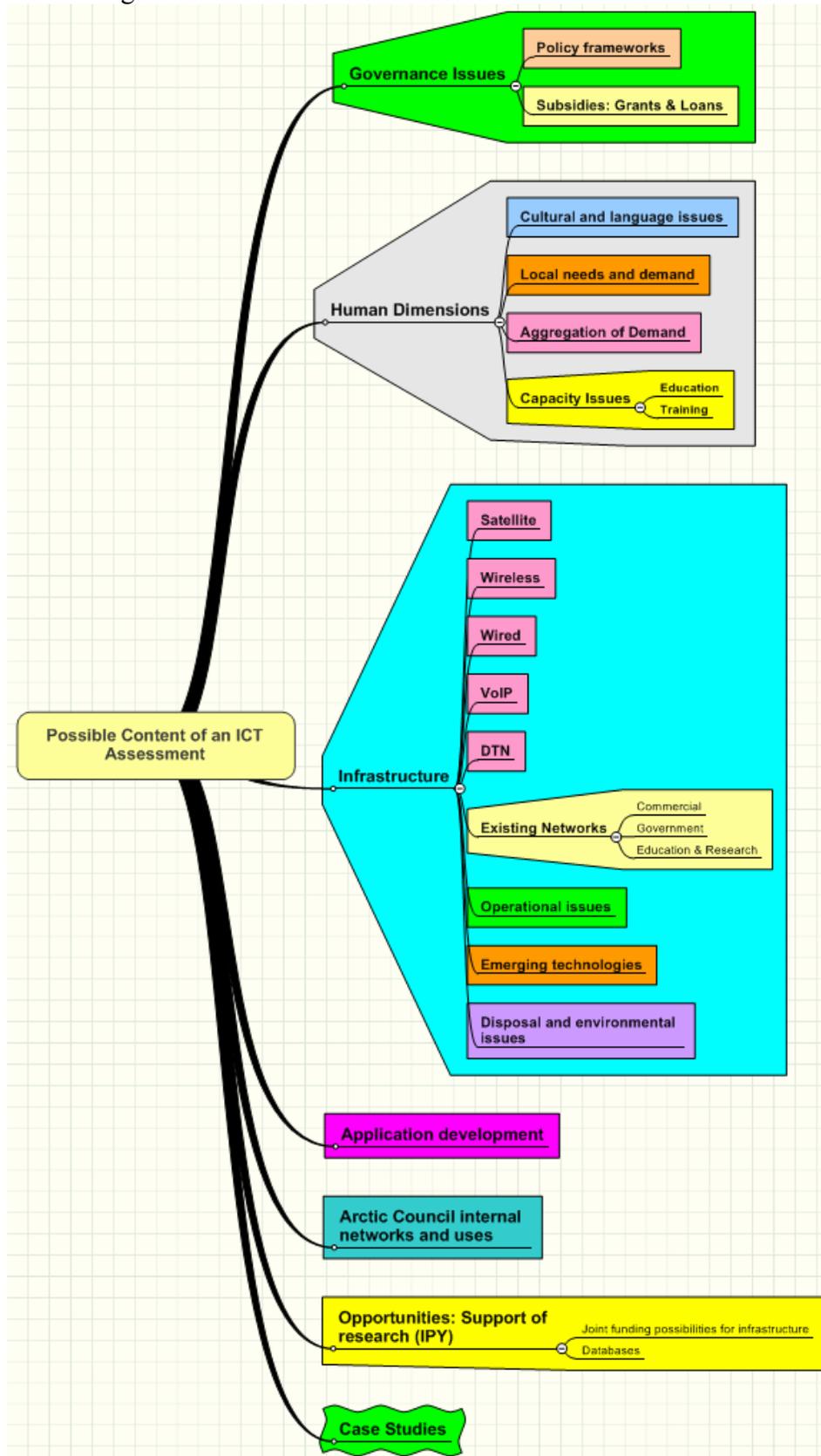
## Possible Content of an ICT Assessment

The idea of an Arctic ICT Assessment emerged from the Washington ICT workshop in February 2005. At that meeting an initial working outline for the possible content of such an assessment was discussed. Several broad areas were suggested (see Figure 2):

- Governance Issues
- Human Dimensions
- Infrastructure
- Application Development
- Arctic Council Internal Networks and Uses
- Cases Studies.

These broad areas are described in additional detail below.

Figure 2: Draft outline of broad content areas for AICTA



## **1. GOVERNANCE ISSUES**

It is proposed that the assessment of governance issues could include:

- Policy frameworks: do they encourage or discourage investment in both ICT and in other sectors;
- Subsidies: is ICT growth in sparsely populated Arctic regions destined always to exist under the weight of subsidies, and, if so, at what cost to the urban centers;
- Trans-national data flows: what regulatory environments either restrict or encourage data flowing between countries (and what type of data);
- Incentives: what provides incentives for sustainable development, a monopoly ICT environment or unregulated ICT environment.

How do policies encourage or discourage development, economic activity, delivery of basic services within countries and between countries? An example is the rapidly emerging technology of Voice over Internet Protocol (VoIP). VoIP bypasses the standard public switched network, thereby eliminating the payment of tariffs for such voice traffic. Deployment of VOIP can dramatically reduce communications costs, but may change the business model of the traditional telecommunications industries. What policies should be adopted to ensure that broadband capacity is available and services such as VOIP can be deployed, while at the same time ensuring sufficient revenue to maintain and extend communications networks in the Arctic?

## **2. HUMAN DIMENSIONS**

Human dimensions will cover cultural and language issues as well as training and education and the impacts of ICT on community structures.

The AICTA has the goal of improving economic and social conditions across the Arctic. At the heart of the applications that will make this a reality is the need to share information in the language of the service recipient. The ability to receive health care, social services, education, etc. in the language of the person involved is an important goal in this process.

For true information sharing to take place, the ability to share information must take account of the needs of all members of the circumpolar regions to communicate in their own languages and dialects.

ICT technologies developed in Canada and elsewhere have made it possible to build bridges between different language groups to enhance communication and support the preservation and enhancement of the diverse cultures found in the circumpolar regions.

Examples include:

- Automated translation software between major language groups;
- Transliteration software for aboriginal writing systems;

- Orthographic transformation software to improve communication among different dialectical groups;
- Sophisticated multilingual search technology;
- Development of web portals;
- Development of terminology databases, online dictionaries.

While the reality of the predominance of English as the circumpolar working language of science and business is not likely to change soon, the ability to access information using many languages including indigenous/aboriginal languages is an important facility for information sharing in the circumpolar regions.

The ability to share cultural information authored in aboriginal languages can be enhanced through the use of some of the tools described above, and the development of new tools.

The specific goals and activities of the AICTA in terms of language and culture would be to:

- Identify existing use of technologies to support Arctic languages within an ICT context. This would include not only tools specific to a particular language, but also tools designed to promote translation, transliteration, etc. between languages.
- Identify major ICT related barriers to information sharing in different languages;
- Develop a set of practical goals for multilingual information sharing in the circumpolar world that would establish a base for future development;
- Identify the gaps between the situation as it exists, and these goals;
- Identify ICT initiatives that would achieve the goals;
- Identify major positive impacts of improved indigenous language use in the social development in the North.

### **3. INFRASTRUCTURE**

The infrastructure section will provide a baseline inventory of ICT infrastructure across the Arctic to include (but not limited to):

- Satellite
- Wireless: mobile and fixed
- Wired: including fiber and cable
- Current and planned availability of broadband and to what level (the home, the community, mobile devices)
- Services such as Voice over Internet Protocol (VoIP), IP-based audio and video
- Emerging technologies
- Existing Networks (e.g. commercial, government, education & research)
- Connectivity capacities within Arctic regions of Arctic Council nations and across the Arctic
- Operational issues: reliability, maintenance in the Arctic environment
- Environmental Impacts and Issues including disposal of equipment.

Infrastructure will also detail the various funding and business models for ICT found across the Arctic; for example, the Alaska model where specific federal government subsidies for health and education telecommunications have provided an incentive for the telecommunications industry to extend broadband services to remote villages. It will examine the total cost of ICTs, from initial investment and installation to final disposal of obsolete computers and other electronic equipment..

Much of the data for this section exists in previously published studies, though depending on the age of the information and the data captured, some of this infrastructure inventory may require working with the respective carriers and service providers of ICT to present a relatively uniform picture.

In short, the infrastructure section could provide a snapshot to serve as a baseline of ICT capacity across the latitudes of the Arctic. Typically this is where most assume an ICT assessment will begin and end. For this assessment it will provide the backdrop.

#### **4. APPLICATION DEVELOPMENT**

Application development will include a catalogue of significant and innovative applications of ICTs in Arctic member states and identify innovative applications elsewhere that could be adopted in the Arctic. It will also illustrate the different approaches taken to solve problems through application of ICT in different Arctic states. An example are two distinctly different models for the delivery of telehealth in Russia and in Alaska, one using mobile clinics with satellite communications and one using fixed satellite services to community clinics. The innovations in distance education exhibited by the programs of the University of the Arctic or the use of video conferencing for distance education in Canada could be highlighted. Applications that promote economic vitality will also be examined, from the ability of fishermen to monitor the market to the marketing of Sámi crafts to a worldwide clientele

This section could also examine the development and leverage possibilities for growth from the national research and education networks that exist in some form in every Arctic nation. These represent the next generation of ICT applications from multicasting over the internet to grid computing for environmental monitoring to redundant, threaded networks for disaster recovery.

Finally, this section could examine the challenges of network security, protection of personal information, and rights to privacy and access.

#### **5. ARCTIC COUNCIL INTERNAL NETWORKS AND USES**

The assessment will also provide an opportunity for the Arctic Council to evaluate its own use of ICT for Arctic cooperation, including the need for internal controls, access and network uses. The internet is the glue that holds the Arctic Council together. All of

the working groups, as well as the Arctic Council itself, have a web presence. Yet, there are no uniform “Best Practices”, website “look and feel”, or guidelines to deal with the issues of:

- Security
- Privacy
- Copyright
- Content management
- Arctic Council portal related questions.

The assessment would be the appropriate instrument to assess the current status of ICT in the context of the Arctic Council and the need for such measures as the ones listed above.

Furthermore, if the Arctic Council pursues the proposal to develop an Arctic Portal, the AICTA project could be a useful forum to examine and inform some of the issues that emerge from the development of the portal.

## **6. CASE STUDIES**

Case studies from Arctic Council member states will examine innovative ICT projects, partnerships and policies that exemplify best practices, for example, communication networks for nomadic Sámi in northern Scandinavia.

At the follow-up workshop in Ylläs, Finland in September 2005 the participants again examined the assessment and determined it should cover at least the following areas for case studies where ICT is used in the Arctic: governance and public services, education, security sector, infrastructure, application development.

The governance and public services dimensions cover both the regulatory frameworks in the Arctic states as well as e-governance issues. The social dimension could cover social care and e-health issues. The education sector covers both distance education and ICT applications in education. Closely connected with education are research and higher education institutions, both local and network organizations (e.g., University of the Arctic). ICT is here seen both as a means for delivery and access for education and a tool for research.

ICT industry and e-business sectors in the Arctic are growing rapidly. This dimension would explore the possibilities and best practices for carving a niche for world-class ICT development in the Arctic. Content and application development opportunities and capabilities have not been examined thoroughly. Experience and entertainment industries already flourish in some Arctic areas.

The tourism and adventure industry sector is in many Arctic areas the largest industry area and in most areas the most rapidly developing area. The assessment can examine the current status of Arctic ICT as it relates to tourism and can offer possibilities for the future.

Transportation and rescue development are part of the larger “safety cluster” developing in the Arctic regions. ICT can play a crucial role as has been demonstrated by the Circumpolar Infrastructure Task Force work on aviation, for example.

## Methodology

The assessment could be organized according to the model whereby the member countries would agree on lead countries to take responsibility for one or more chapters of the assessment. Interdisciplinary author/researcher teams from across the Arctic would be nominated to prepare the chapters. One or more editors-in-chief would be retained at the appropriate time to consolidate the chapters into a final, publishable report.

Data would be collected so comparison could be made with similar ICT data collected by other international studies such as those sponsored by the ITU. This will allow for comparative analysis with other world regions and provide a common baseline for future assessment.

## Information and Data Sources

The two workshops on Arctic ICT conducted during 2005 revealed a rich array of information and data sources that could be usefully analyzed for purposes of an assessment.

On-the-ground, concrete ICT projects in all the regions provide further information and data that will be relevant to the assessment.

In addition, the World Summit on the Information Society held in Tunis in November provides sources of information for the larger context of ICT in the Arctic states and globally that are relevant for context and methodology issues. (See ANNEX A)

Other sources include:

- The International Telecommunication Union (ITU), which provides indicators and case studies on ICTs in developing regions
- Organization for Economic Cooperation and Development (OECD) which provides information on ICT trends and policies in member countries and research methodologies. National ICT goals and policies from Arctic Council member states. Research on ICT applications and policies carried out by universities and research institutes in Arctic Council member states.

## Management

It is proposed that the ICT Network which conducted the two Arctic ICT workshops in 2005, could be directed to act as a steering committee to coordinate the assessment work

on behalf of the SDWG. The ICTN would also engage expert groups from educational and research institutions to collaborate by providing contributing papers and information. An executive committee would be selected from the ICTN to manage the actual day to day issues relating to the preparation of assessment. The SDWG Secretariat, in coordination with the Circumpolar Infrastructure Task Force Secretariat, could provide assistance as required, for example to arrange meetings, provide website services, and so on.

### Languages

The Assessment would be prepared in English with efforts to secure funding to translate the final report into Russian.

### Financing and budget

The details of cost and methodology, as with all Arctic Council assessments, will be subject to some modification as an assessment progresses. There is considerable experience with conducting assessments in the working groups of the Arctic Council. This would be the first major assessment conducted by the SDWG. The SDWG would hope to benefit from the experience of other working groups as well as engage them in those areas which are most relevant to their mandates.

The budget will be prepared on the basis of the phased approach as the assessment moves forward.

Sources of funding and in-kind support include:

- Arctic Council sponsored and paid for (i.e. voluntary contributions of Arctic States, Permanent Participants, and Observers);
- Public-private cooperation;
- Educational and research institutions;
- New Arctic Council project support fund; and
- IPY, EU, NCM funding for some aspects.

## **PART II:**

### **DEVELOPMENT OF PRACTICAL ICT PROJECTS**

Sweden indicated at the SDWG meeting in Khanty-Mansiysk that their priorities lay more in the realm of pursuing practical ICT projects in parallel or intersecting paths with any assessment. Depending upon the nature of the projects, they may augment the assessment.

Coming out of the Akureyri conference, eight ICT projects have been proposed or suggested to the Sustainable Development Working Group. They are:

- facilitate and support the setting up of the Target Region Arctic IC Enquiry (TRAICE), a specific ICT pilot project within a limited and carefully selected area in the Arctic. The project should identify specific needs of disadvantaged and disconnected local communities and promote implementation of connecting networks, through appropriate infrastructure and ICT access. The project would be established with a view to the possibility of reproducing it elsewhere (proposed by SCPAR);
- support the establishment of a wireless Arctic network;
- support a pilot telemedicine project of the State of Alaska, the Sakha Republic and the Khanty-Mansiysk Autonomous Okrug (proposed by the Northern Forum and the Alaska Native Tribal Health Consortium (ANTHC));
- support the development of a northern indigenous peoples' enterprises with the aid of new ICT (NIPE-ICT);
- support the development and promulgation of the eHome Health Care project (proposed by Finland);
- support and encourage the Broadband in Rural and Remote Areas (Birra) project (proposed by Finland);
- encourage the establishment of the Arctic Virtual Library to support Arctic people and science;
- take measures to support the use of small Arctic languages.

It is expected the assessment and gap analysis can assist in guiding the SDWG as to what projects are of the most critical and if the current infrastructure can support such efforts.

### **Conclusions**

An assessment of ICT in the Arctic is timely, achievable and needed. ICTs are integral for every area of sustainable development. The rapidly changing nature of ICT warrants a coherent view of the governance, application, technology and impacts, both intended and unintended in all the Arctic nations. Existing studies and analyses have excluded consideration of the Arctic as a region in regards to ICT. This assessment will rectify that

situation, provide a significant baseline study for the future and add the Arctic to the map of recognition in the ICT world. The assessment will identify and describe best practices in ICT among the member nations and provide the outlines for others to consider and possibly follow. The cultural impacts and implications of ICT will bring to the surface for examination and discussion how ICT may help or hinder the cultural and social relevance for peoples of the Arctic. The parallel timing of the International Polar Year allows the opportunity to cooperate and possibly co-fund this ICT assessment with IPY activity.

**APPENDIX A: SAMPLE OF RESOURCES**

World Summit on the Information Society (WSIS):

Some of the presentations relating to the Arctic states include:

- Competition Policy In Telecommunications: The Case Of Denmark*
- Creating Trust In Critical Network Infrastructures: Canadian Case Study*
- Promoting Broadband: The Case Of Iceland*
- 3g Mobile Policy: The Case Of Sweden*
- Competition Policy In Telecommunications: The Case of the United States Of America*
- Shaping The Future Mobile Information Society: The Case Of The Kingdom Of Norway*
- Fixed Mobile Interconnection: The Finnish Case*

Relevant resources on research and methodology:

- PROJECT DOCUMENT: Partnership on Measuring ICT for Development  
Measuring ICT: the global status of ICT indicators.*