Industry Canada's C-Band Transponder: A Public Benefit for Delivering Broadband Connectivity in First Nations, Rural and Remote Communities

April 22, 2002

Chariperson's Welcoming Remarks:

Ken Thomas Neegan Burnside Engineering & Technology, AFN, K-Net

- vision of broadband, NBTF
- opportunity for sharing and examining the opportunities to use these resources

Introductions

1.	Alison Rogan	CED Division, Government of Nunavut
2.	Rick Kimbell	Public Works, Iqaluit, Nunavut
3.	Glenn Steiner	IC representative in Nunavut
4.	Borys German	Spectrum Engineer with IC working with Nunavut
5.	Linda Maljan	GNWT (Yellowknife)
6.	Jacquelyn Burles	GNWT (Yellowknife)
7.	Jeff Philipp	SSI Micro (Yellowknife)
8.	Eric Eid	NWTel (Whitehorse)
9.	Wayne Boyce	Telehealth Program Manitoba (Winnipeg)
10.	Glen Collins	Project Manager, Manitoba Telecom (Winnipeg)
11.	Maurice Montreuil	Manitoba Broadband (Winnipeg)
12.	Frank Fazio	IC Business Development Officer, Manitoba
13.	Alfonz Koncan	Western Economic Diversification Program, Manitoba
14.	Sheila Engel	Manitoba Health
15.	Norma Spence	Manitoba Industry, Trade & Mines
16.	Ian Cameron	BC / Alberta Schoolnet help desk, BC
17.	Peter Boorman	Vancouver Teleport (Vancouver)
18.	Bryan Orthner	Headwaters Project (Smart Saskatchewan)
19.	Ken Alecxa	Western Economic Diversification Program, Sask
20.	Ken Thomas	Neegan-Burnside Engineering & Technology (SK)
21.	Brian Beaton	K-Net (Sioux Lookout, ON)
22.	Dan Pellerin	K-Net (Sioux Lookout, ON)
23.	Carl Seibel	FedNor (Thunder Bay, ON)
24.	Mike Collins	Telesat (Ottawa)
25.	Ed Miller	Telesat (Ottawa)
26.	Jim Hamilton	Communications Research Centre Canada (Ottawa)

27.	Patrick Haggerty	INAC (Ottawa)
28.	Jacques Drouin	Connectivity Manager, IC SchoolNet (Ottawa)
29.	Rachel Roy	Industry Canada First Nations SchoolNet (Ottawa)
30.	Will Dubitsky	Industry Canada SchoolNet (Ottawa)
31.	Rick Sellick	Neegan Burnside Engineering and Technology
32.	Gordon Cobain	Katavik Regional Government, Kuujuuaq/Nunavik (QC)
33.	Stéfane Boudrias	SOCAM (Quebec City), (via teleconference) - 3 additional participants
34.	Cindy Robbins	Smart Labrador (via teleconference)
35.	Doug Robbins	Smart Labrador (via teleconference) Glen Collin, Manitoba
36.	Bill Evans	EB Systems Limited, Winnipeg

REGIONAL PRESENTATIONS

1. Presenter: Gordon Cobain **Katavik Regional Government, Kuujuuaq/Nunavik (QC)**

# of Communities requiring satellite services:	14
# of Operational Communities with C-Band data earth stations in place	1
# of Communities using Anik E2	1
Target dates for proposed network (14 sites)	Q3 2002

Summary of Presentation: (powerpoint presentation available)

- Nunavik Satellite Communication,
- population of about 8,700, mainly Inuit people, community sizes range from 2000 to150 people
- Bell Canada only service provider delivering voice services with a maximum of 14.4k data service to connect via long distance to an ISP
- Challenges include shipping equipment to communities
- pilot project funded by Quebec government to complete phase 1 involving the installation and testing of C-Band satellite dish and applications
- established a non-profit organization to deliver high speed internet, improve access to broadband services / applications (health, distance education, gov't services, video conferencing, wide area networks, worldwide exposure for e-commerce)
- the project (Phase 1) objectives involved designing and establishing a single hop inter-community data traffic (full mesh) satellite service capable of delivering video conferencing, dynamically assigned bandwidth as required
- Outcomes: Kuujjuaq - dish in place, proof of concept established, testing and evaluation completed, demos of wireless, video conference and voice over IP completed, client evaluation of system done, and complete analyze and evaluation presented (about 200 page document)

- Phase 2: All other Nunavik Communities, targeting Q3 2002

2. Presenters: Cindy and Doug Robbins **SmartLabrador**

# of Communities requiring satellite services:	11
# of Operational Communities with C-Band data earth stations in place	10
# of Communities using Anik E2	10
Target dates for proposed network (23 communities)	UP

Summary of Presentation: (powerpoint presentation available, handout in package)

- 41 sites in 23 communities plus 2 communities in NFLD
- clinic and public access sites established in each community delivering internet access, video conferencing, telehealth (making up about 1/2 the project), every health site but one connected today
- Labrador consists of about 30,000 people, 32 communities with 4 to 14 people in the smallest communities, the SmartLabrador network is serving communities ranging in size from 65 to 10,000
- objective is to deliver equal access no matter where you live
- seeing changing to the region with the introduction of a new road along the south coast connecting some of the communities in this part of the region but the communities in along the northern coast are remote
- Goose Bay (service centre for the region) and Labrador City are considered urban providing links to the smallest centres across the region
- the network consists of a hybrid solution consisting of satellite, terrestrial and local wireless technologies
- Board of Directors are community development folks with the project being developed by the regional economic development board, the project is built on models proven by these groups with a focus on community-based learning
- Training of volunteers at sites for video conferencing, network of volunteers
- Partners include educational institutions
- Sample applications already utilizing the network include meetings of cancer support groups, literacy groups wanting to get together, contacting other groups, teachers testing students, virtual student exchange with England and North coast students (now interested in getting connected to neighbouring community)
- Half sites in schools, video conferencing and public access (now the other schools are interested in getting connected)
- Smart services include telehealth, court services, education, video connections to Gov't departments in Goose Bay and St. John's
- Labrador residents committed to their own communities, train-the-trainer, building a learning network along side the technology network, take off
- link to St. John's - telemedicine and St Anthony
- 11 by satellite and the others by frame relay, wireless used between the communities and within the communities, miles between the communities,

Lucent technologies
- telecom partners are Alaint and Telesat
- separate bandwidth, 512K for video and internet providing 128K outbound on separate channels (Internet traffic share a common inbound channel 768K)
- same strategy for frame relay service with 128k allocation for local internet service

3. Presenters: Stefan / Pierrette / Danielle / Anne Marie **SOCAM Initiative for Quebec First Nations**

# of Communities with access problems (some might require satellite service):	23
# of Operational Communities with C-Band data earth stations in place	0
# of Communities using Anik E2	0
Target dates for proposed network	dependent on fundraising

Summary of Presentation: (handout in package)
- 27 communities on CAP, 24 were able to be connected
- 3 ended up returning the dollars to Industry Canada due to connectivity problems
- see information distributed in the package for description of different regional challenges and needs
- some do 56k, T1 ($3,300 per month),

4. Presenters: Dan Pellerin / Brian Beaton **Keewaytinook Okimakanak (K-Net Services)**

# of Communities requiring satellite services:	12
# of Operational Communities with C-Band data earth stations in place	2
# of Communities using Anik E2	2
Target dates for proposed network	UP (with 6 more being added Q2 2002)

Summary of Presentation: (powerpoint presentation, handout in package)
- tribal council partnering with a number of others to establish broadband connectivity and required applications
- scalable network model, 2 communities on-line today with 6 more being added Q2 - 2002, 4 other First Nations are satellite served as well
- utilizing the community aggregator model from the NBTF

5. Presenters: Linda Maljan / Jacquelyn Burles, GNWT Eric Eid (NWTel) / Jeff Philipp (SSIMicro) **Northwest Territories**

# of Operational NWT Communities with C-Band data earth stations in place: 21

# of NWT using C-band infrastructure to offer ADSL high speed Internet Service to residential and business customers:	1 (Inuvik)
# of NWT Communities using Anik E2:	21
Target dates for proposed network	UP

Summary of Presentation: (from speaking notes)

Linda Maljan and Jacquelyn Burles, GNWT:

- GNWT leases space on Ardicom, - 33 communities, population of about 40,000 ranging in size from 53 to 18,000
- telehealth services being delivered in 3 NWT communities with 4 more communities scheduled to come on-line, bandwidth and pricing concerns
- Distance education is available for completing high school in every school. In the smaller communities some Grades 10, 11 and 12 courses are available only via distance education for a number of reasons. Distance Ed courses are purchased from Alberta, which has the same curriculum as the NWT. As Alberta increases their bandwidth through Supernet and alters the delivery of course content to take advantage of this increased capacity, NWT students may lose the ability to participate in the distance ed. courses.
- 64K data services that is shared by the community resulting in no one being happy any longer due to increased usage / demand and required broadband applications
- Community members use the school sites or community learning centres for public access through CAP sites, and through a new virtual libraries project.
- Issues - big hopes for NBTF, local access in 8 communities (local ISPs), last mile connectivity, GNWT pays to use network as anchor tenant, need more bandwidth, cost of services, partnership vs contract
- Looking for partners and finding ways to improve efficiency and reduce cost
- objective is to establish equitable access

Erik Eid, Northwestel:

- Northwestel provides telecom services for Yukon, NWT and Nunavut regions using a satellite network involving dishes ranging in size from 4.5 to 10 meter, can add bandwidth without investing in additional infrastructure but transponder (i.e bandwidth) costs are a big factor
- Ardicom is a joint venture with Northwestel with the gov't being the anchor tenants on the network
- Northwestel can add Bandwidth to existing C-band satellite infrastructure, have 48 satellite nodes in total: 26 Nunavut, 1 in Yukon, 21 in NWT

Jeff Philipp, SSI Micro

- new venture private venture to build their own satellite network after reviewing the alternative business cases, Power Corp is anchor tenants, business case for providing internet in the smaller communities if they can be all sharing the same virtual network, lower cost to access, 4.5 m dishes used (shipping and cost challenges), capable of 6M transmission, bandwidth is dynamically allocated

using TDMA platform, video conferencing, multi-tasking, 10 communities on-line today (Nunavut) with potentially 13 this year (plan involves connecting all communities in Nunavut and half in the NWT), overhead is lower, IP based, VOIP capabilities, inter-community traffic is lower, determined that the return on investment is 12 months, expansion of the network is possible using existing platform but would require additional resources to add in video conferencing management with QoS and CIR, partnering with birth-right corporations

6. Presenters: Eric Eid - Northwestel **Yukon overview**

# of Communities requiring satellite services:	1
# of Operational Communities with C-Band data earth stations in place	1
# of Communities using Anik E2	1
Target dates for proposed network	UP

Summary of Presentation: (from speaking notes)

Northwestel has a total of 48 C-band satellite nodes in the North:

1 in the Yukon
21 in the Northwest Territories (NWT)
26 in Nunavut

All of Northwestel's Satellite Communities use Anik E2
Bandwidth to each community ranges from 64 kbps to >T1.

- ADSL services in place in all 12 Yukon communities with government being the anchor tenant, video bridging services available, long-term service contract, development strategy involved levering infrastructure to offer local connectivity, interactive video, ICT business development
- completed by 2001
- 90% of households have access to high speed
- 384 to 768 kbps for video conferencing
- a terrestrial build- trunking between data switches ranges from 2Mbps to 45Mbps

7. Presenters: Alison Rogan / Rich Kimbell **Nunavut**
Eric Eid / Jeff Philipp

# of Nunavut Communities requiring satellite services:	26
# of Operational Communities with C-Band data earth stations in place	26
# of Communities using Anik E2:	26
Target dates for proposed network	UP

Summary of Presentation: (from speaking notes)

- Nunavut Broadband Task Force (NBTF) formed to get private sector partner, gov't of Nunavut main driver of the economy, 26 recommendations to deploy broadband to businesses, gov't, agencies
- Culture, education, health big drivers for broadband in Nunavut
- working with private sector to submit proposal to IC, recommended that deploying 17 projects to push transformation to knowledge economy
- Decentralized gov't, covering a region making up 1/5 of Canada, population of about 50,000,
- Health budget of about $670 million with $30 million to cover medical travel, quality of health care is terrible
- Education is similar as NWT, Grade 12 available in all schools
- Public access sites available in 11 communities with partnerships with Microsoft and Gates to develop an enhanced local service
- Challenge to afford present costs for connectivity, no tax base, 94% of population in public housing
- with a very vibrant economic potential for example film making, stone carvers, etc requiring on-line presentations and broadband connectivity
- 14 communities are not part of the decentralized gov't providing local jobs and services, ie. very challenged economically
- 26 communities connected via satellite, 64K to 512K with room to expand, paying for bursting capabilities - main tenants include RCMP, Parks Canada, Articom, Gov't of Nunavut
- Challenged to deliver to decentralized communities, developed and implemented 2.5 to 1 for compression, scale the usage to manage the available bandwidth on site, majority of internet traffic is thru Yellowknife POP with several bottlenecks, the double hops to T1 that is filled very quickly
- Moving Forward proposal instead of subsidizing connectivity, looking to Gov't of Nunavut, support local organizations and services that are not on-line
- commitment from Industry Canada for public benefit usage of transponder for projects, bring together players
- willing to circulate Moving Forward proposal

8. Presenters: Maurice Montreuil / Glen Collins **Manitoba**
Wayne Boyce

# of Communities requiring satellite services:	?
# of Operational Communities with C-Band data earth stations in place	3
# of Communities using Anik E2	3
Target dates for proposed network	UP

Summary of Presentation: (from speaking notes and powerpoint presentations)
- representing the telecom needs of First Nation, northern and Metis communities
- Connectivity in the PDN (provincial data network) but others are not included

- some have one party line, looking for equitable access
- government supporting the principal of equity of service and price no matter where we live
- Community members lacking education opportunities, 62 First Nations and many Metis communities, north of 54 parallel, nursing stations do not have the connectivity, need to start with health and move to the community wide applications
- supporting the concept of regionally owned telecos and provision of local services
- some resource based communities are losing75% of their population (Leaf Rapids, Lynn Lake)
- satellite served communities connecting to terrestrial network serving all community members and owned by the region
- communities are raising their own capital with the plan to develop their own business
- sharing the resources so they can grow and develop local opportunities
- telehealth network (funded by Health Canada - CHIPP), 17 sites, Health Sciences Centre as the hub
- Churchill, Lynn Lake and Leaf Rapids (C-Band), Berens River (Ku-band)
- 512K access for video connectivity
- legacy ISDN equipment is being kept in operation for reaching other centres
- delivering some services into Keewaytinook Okimakanak (telepsychiatry, etc) Nunavut (5 communities) therefore dealing with different carriers and cross border health issues
- contract with Gov't services, Provincial Data Network,
- using T1 lines, can be expanded as move to broadband, multi-point control unit to be able to connect all the sites, need for ongoing CME, grand rounds, from site- to-site-to-site for seeing patients, establishing a gateway for connections to other ISDN served health centres
- cost avoidance studies, HC studies, for patients avoiding travel, need to consider health administrators, health professionals as well
- PDN - shared network access point, VPNs for various clients,
- establishing 100 M, 4-10M, broadband circuits on an IP network in 85 communities
- replacing existing Frame relay network
- government is purchasing services from telecommunication vendors under contract until December 2006, using MPLS for QoS
- telecommunication vendors can sell services to other customers within the community
- 3 satellite served sites - roving 768 for telehealth with downlink to Winnipeg
- satellite service under contract until Nov, 2002

9. Presenter: Bryan Orthner **Saskatchewan**

# of Communities requiring satellite services:	~6
# of Operational Communities with C-Band data earth stations in place	0
# of Communities using Anik E2	0
Target dates for proposed network	

Summary of Presentation: (from speaking notes)

- Northern Sask, size of Texas, same challenges, distance, requirements as described from other regions
- using connectivity to solve some challenges
- Fairly good road infrastructure, there are a few communities only accessible by winter roads and plane
- Region has a population of about 35,000 with 2 communities without any phone at all
- SaskTel has fibre infrastructure providing toll free dial up ISP service for those community off the digital network
- In the north, 28.8 to 14.4k connect speeds due to quality of existing phone network
- SaskTel is owned by provincial gov't therefore the shareholders are the people of the province
- Provincial gov't CommunityNet announcement providing connectivity across the province with the gov't being the anchor tenants, SaskTel uses the dollars to scale up to DSL service throughout the communities
- Provided to 45 communities, DSL available to anchor tenants but no incentive for the rest of the community
- in the Headwaters Project (under the Sask. smart communities demonstration project) 42 CAP sites in 35 communities, 6 have DSL in 9 sites, with new 9 sites scheduled to receive DSL service
- Sasktel provides the educational community with the equivalent of the DirecPC solution but using an existing transponder for Sask only and therefore the speeds back into the communities is reasonable and consistent
- about 400K down with phone connections for uplink from the provincial schools
- First Nations education system is another story, limited to satellite solution (example of local First Nation had to buy DSL as their own local solution - $45 dollars a month - $1700 for T1)
- satellite service is managed by SCN
- Sasktel for DSL access in LaRonge in the north
- Internet provided by MSAT phone and DirecPC and cell phone connections in a couple of community schools
- About 30 communities, reached by land
- estimated 6 communities outside of SaskTel network and might require satellite
- story of receiving 4.8 m dishes folded in half by shipper

10. Presenter: Ian Cameron **British Columbia / Alberta**

# of Communities requiring satellite services (estimate): ~12 in BC, 2 in Alberta
# of Operational Communities with C-Band data earth stations in place 2
# of Communities using Anik E2 2
Target dates for proposed network

Summary of Presentation: (from speaking notes)

- providing First Nations with helpdesk advice (technical, installation, some operational) for the local schools through Industry Canada's First Nation SchoolNet program
- North of 50 degrees all the schools are using the DirecPC back haul limited by outbound speed (9.6k with a max 14.4k for dial up service) - no longer satisfactory due to overselling and congestion on DirecPC service
- 6 without phones, therefore using MSAT phones with DirecPC backhaul (4.8K outbound) - no longer acceptable
- communities are now purchasing two-way satellite system (C-Com) and using it for things like e-mail to doctors (in one community without phones), shopping on-line, etc
- further north, some communities are reporting paying $1200 to $1400 in long distance charges to the nearest ISP
- these communities do not have fair and equitable access to telecom services
- economic development opportunities are undermined by this situation
- communities are looking for the solutions to make this work and some are now investing in getting their own solutions but most lack the financial resources to deliver true broadband
- in northwestern Alberta there are 2 communities that can only be reached by satellite and on the coast in BC, 15 communities will need C-Band solutions
- telehealth, education, economic and business development will be the main applications for broadband delivering data, video and voice services

11. Presenter: Peter Boorman **Skybridge a Global Solution**

Summary of Presentation: (from powerpoint presentation)

- Vancouver Teleport, involved in building networks for telecos and enterprise networks
- as Northwestel's ex-president, lots of experience in design, construction and maintenance of satellite service in very difficult environments
- weather conditions, technicians get noisy lines, service requires high cost, very expensive if we use the same standards established by the telecom industry
- Ardicom contract, 58 communities using a frame relay connection
- Partnership of both aboriginal partners and the local telco with government as the anchor tenant
- Low speed IP data and video on demand only

- Provides communications to 70 plus remote communities
- Voice over IP not feasible in present network architecture
- 54 communities out of 96 do not have internet for residential level
- $14M to put in place, expensive switching, new sites (almost all of them)
  Identified Pitfalls include:
  - development has not kept pace with innovation
  - bandwidth very limited eg 64/128k on satellite
  - bandwidth oversubscribed in the communities
  - frame relay costly on satellite connections with only 30% payload
  - latency excessive especially between remote sites
  - poor utilization of satellite transponder with 50% wasted assignment
- cooperative networks are one solution for management of earth station, cooperative management of network, bidding on the sites

12. Presenter: Jeff Philipp **Inukshuk Wireless Solutions for the Last Mile**

Summary of Presentation: (from experience of working with Adamee and Microcell)
- wireless 802 Ghz, 802.11a and b standards coming on-line
- product pricing is reaching point where is affordable and accessible
- access point into the commercial market is getting closer
- ISM band
- IC 2.5ghz, boost power, non line of sight, low cost, high density, customer centre
- Dial up Internet service is an impossible business case without aggregation of communities
- Co-management - roaming with accounts, multi-sites, with billing based on usage
- Controls to limit connecting, establishing policy.

Summary:

Ken Thomas - different points of view, exploring all the options, representing the interest of First Nations, learn from other solutions

Meeting adjourned at 6:00 pm to meet again at 8 am the next morning