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December 23, 2004

Regulatory Commission of Alaska

HAND DELIVERED

RE: Comments in Opposition to UUI request for additional Rural Broadband Grant Funds

Commissioners:

You will do a grave disservice to rural residents by providing a 200% increase in grant funds to United Utilities to install their ground based intranet system. It is unbelievable that you would even consider such a request without first seeking alternative, more cost-effective proposals.

The greatest disservice to rural residents would be to install such a grandiose facility as that proposed by UUI, without ever considering the impact on the local economy. Not only will the replacement costs (which were not detailed within the request for additional funds) make this project unsustainable, but it would preclude any possibility of local ownership and control over broadband services. The lack of local ownership or interest in the facilities would result in the continued extraction of scarce dollars, without any tangible benefit to the community.

As an alternative, VTMS proposes to install a community-owned system in each of the communities affected by the grant. The total cost is less than $1.5 million for deploying, operating and training local residents over the 18 month grant period. VTMS has successfully received approval of a broadband grant from USDA RUS for the village of Anvik. The grant requirements and application were identical to that issued by RCA, with the exception of the requirement that the community provide broadband service to the school and clinic, free of charge, for two years.

I have attached documents from Anvik's grant application, that detail how a community-owned broadband facility is sustainable, and spreadsheets that document how a connection fee of just $65 will provide the required community match.

Thank you for this opportunity to comment on this unreasonable request by UUI.

James Stevens

Section 4 C Benefits derived from services

Documentation of Economic, educational, health care, and public safety issues

LOCAL ECONOMY

Anvik is a predominantly subsistence economies, where the residents are primarily engaged in the hunting, fishing and harvesting wild plants. The residents participate in a cash economy by performing seasonal work and by the sale of crafts and items of art. The per capita income Of Anvik is below 50% of the National PCI.

Increased bandwidth will enable local and community businesses to increase the sale of value-added seafood products, arts and crafts, and other products. The use of web sites to advertise visitor services will enhance efforts to develop tourism destinations and increase visitation. The Village Internet System has sufficient storage space on the server for each user to create their own web site and enable e-commerce. A community Arts and Crafts Cooperative can create a web site that is easily updated with photos of available inventory. A community Fisheries Cooperative can post available products to take advantage of Federal Subsistence rules that allow for the sale of products on an individual to individual basis. Both of these sites could then be linked to visitor kiosks in urban areas, such as the Alaska Native Heritage Center, or beyond, to generate sales.

Users will also be able to earn income by providing data processing services. The processing of third-party medical billings for insurance companies is a growing opportunity for home-based businesses. Since these services are paid on a piece-work basis, residents can establish their own work hours and pace. Payroll, accounting, and grant/project management services are other examples of work that can be performed at home via the internet.

EDUCATION ISSUES

The implementation of the No Child Let Behind Act, by school districts in Alaska, tests students for yearly progress, and establishes minimum standards for graduation. According to the State of Alaska's Department of Education and Early Childhood Development's web site (www.eed.state.ak.us) The school serving Anvik has failed to make adequate yearly progress, and less than half of those students have passed the High School Graduation Standard Exam, which is required to obtain a diploma.

The increase of bandwidth to broadband speeds will improve the level of instruction and lead to improvements in standard test scores. For example, by enhancing the quality of video conferencing, the delivery of specialized or advanced instruction could be attained. This would allow a school district to utilize the talents of its staff (or share the cost of specialized teaching with other districts) throughout the district without an associated increase in travel costs. The use of videoconferencing over the wireless network would allow the delivery of educational content into homes, where learning would occur at the pace of the individual.

The network server and integrated data management services of the Village Internet System would create demand for content that delivers distance learning, both academic and vocational. The System's server has the capacity to cache information from websites for later access by users. This enables teachers to request data, such as single-subject videos, to enhance classroom instruction and internet research by students, based on individual teacher lesson plans. Delivery of such content would occur during non-peak use times, which in turn reduces the operating costs associated with dedicating bandwidth for specific users such as schools.

There are no distance education programs for adults available over the internet. This prevents adults from obtaining their GED, or pursuing higher education within their community.

The availability of Community Access Points will allow residents to continue their education, obtain their GED, and to receive periodic instruction over a video conference link. The server was primarily designed for the affordable delivery of educational content. The Tribe will use grant funds to deliver the following educational services.

The training component's goal is to provide both initial and long term, local training support for new and existing customers and users of the wireless Internet system. By training two local candidates as "Internet trainer/technicians", the grant will establish a local capacity to sustain ongoing training and orientation programs for new customers beyond the initial customer training provided by the grant.

To assist the implementation of local wireless service to local customers and the general public of Anvik, two training components will then be provided: (1) Two local qualified candidates will be recruited and trained as "Internet trainer technicians". Specifically they will attend a "Train the Trainers" 1-week, 2-credit, intensive course Kuskokwim Campus (KuC), University of Alaska Fairbanks located in Bethel, the regional hub that serves Anvik. The course will focus on Microsoft based Internet software operation and on how to utilize the Internet for e-commerce. (2) Up to 20 local customers will complete a 1-credit, intensive course presented by KuC staff in Anvik to train each new customer in the use and application of Internet software and wireless system use. The visiting KuC instructor will coordinate and co-teach the class presentations with the recently trained local "trainer technicians.

KuC has developed distance learning and degree programs that can be accessed only where broadband is available. Once the Village Internet System is operational, these courses will be available to local residents.

PUBLIC SAFETY AND GOVERNANCE

While many communities across Alaska receive limited law enforcement and protection through the Village Public Safety Officer program, Anvik is not served by this program. Anvik is developing a Tribal court system, but the State is unwilling to cede jurisdiction

over misdemeanor offenses to Tribal governments. The Federal government has recently created a Rural Justice Commission to study the situation and develop recommendations for the establishment of a rural justice and law enforcement system.

In any case, increased bandwidth will enhance the delivery of governmental services, including public safety by the Tribe, or other mechanism established by Federal and State authorities. The availability of broadband would, at a minimum, allow for a system of tele-justice, where misdemeanor crimes could be resolved via video hearings and sentencing.

Local government will have greater access to web-based applications for federal and private grants and associated filing of reports.

Anivk is a member of Tanana Chiefs Conference, a regional consortium of Tribes. Each Tribal government must frequently send representatives to Fairbanks to attend meetings. It is intuitively understood that substantial savings can be realized through the use of teleconferencing for inter-village and regional meetings, in both air travel and lodging. Phone charges can be reduced by using the Voice over Internet (VoIP) features, and the establishment of Regional and sub-regional utility cooperatives, would reduce the operating costs of utilities, through the use of broadband connectivity, while preserving the jobs associated with utility management within the affected area.

Inter-village connectivity will increase the level and effectiveness of regional cooperation by creating a collaborative, interactive environment for village leaders, culture bearers, and youth.

The Village Internet System facilitates the creation of internet conference rooms. Such conference rooms allow authorized individuals to discuss community, cultural, or social issues in a protected environment. This allows for open discussion between village leaders to develop responses to issues, and for the sharing of information, to create unified positions on community concerns prior to public posting.

The server facilitates the creation of village web sites, bulletin boards, and other methods of disseminating information to residents.

Section 5 System Design

The Tribe will install the Village Internet System developed by Village Telecom Management Services, LLC. The wireless distribution of internet service will occur over a network of overlapping "hot spots" in each community. The Tribe has received an Indian community Development Block Grant to construct a community center. 500 square feet has been allocated for community access points for use by the general public. At a cost of over $150 per square foot, the value of the space is $75,000, far in excess of the required match.

SYSTEM DESIGN

VILLAGE INTERNET SYSTEM

OVERVIEW

The Village Internet System is composed of three components : the satellite link, composed of a 2.4 meter dish and modem, the network server, which processes all data for distribution, and the wireless distribution system, composed of wireless access points and relays (APRUs).

The satellite dish and modem will be mounted on and in the Anvik Tribal offices' building. The APRUs will be positioned throughout both communities to establish wi-fi hot spots.

The Tribe will construct a community building in the summer of 2005 which will include space (approx. 500 sq.ft.) for the placement of community access points.

The Village Internet System provides internet access through the creation of overlapping wireless "hot spots." A *hot spot* is an area within the village where any authorized user can access the internet. By creating multiple, overlapping hot spots, coverage is provided to the entire community. Each "hot spot" also provides separate, dedicated channels for secure access by schools, health care workers, local cellular phone service, and residential or business users.

VTMS continuously reviews available technology in order to find the most cost-effective, efficient, and scalable system for deployment. ***Scalable*** refers to the system's ability to adapt to new technology or add additional features, such as voice/cell phone service, without expensive equipment changes. Other criteria used in the selection of equipment include:

- Low installation or conversion cost to the end users - school, residents, businesses, government
- Durability/reliability - the ability to withstand harsh environmental conditions with minimal maintenance, low energy costs.
- Remote technical support - the ability to provide technical support and operations from outside the village, to minimize operating costs and strains to local human resources.

An available option for the Tribe's consideration is an inter-village link that establishes a high-speed link to any village within a 35 mile, line-of-sight radius. This enables the Tribe to eliminate the cost of separate satellite links and servers in each village, and to reduce the recurring costs of satellite time and technical support.

Based on the requirements described above, VTMS recommends the following components.

Satellite link **Capital cost: $15,000**

VTMS reviewed proposals from companies based in Vancouver, B.C. (Infosat), Scottsdale, AZ (General Dynamics) and Anchorage, AK (Microcom). The following criteria were used to evaluate the satellite link:

- Cost of Dish (installation costs were not part of any price quoted)
- Required dish elevation. The elevation of the dish refers to the how high above the horizon the dish must be pointed. The lower the elevation, the greater the chance the satellite signal could be blocked by obstructions, e.g., buildings or trees. Therefore, a higher elevation is preferred, to avoid the cost of constructing towers to mount the dish upon.
- Monthly satellite access fee, including throughput volume limits. *Throughput volume limits* refer the amount of data that can be transmitted in a month's time without incurring additional charges.
- Bandwidth, also known as "transmittal speed." VTMS requires a minimum bandwidth of 512 Kbs in each direction, to allow a higher quality video conferencing capability.

Infosat's price was $30,000 for a 2.4-3.1 meter dish. Monthly use charges were $1300, and required that a minimum of 10 villages participate to qualify for this price. Access speed was 1.5 Mbs from the satellite down, and 330 Kbs from the village up. Throughput limits were mentioned, but not quantified. **General Dynamic's** price was $15,995 for a 2.4 meter dish with de-icing equipment, and their monthly charges are $2900, with a monthly throughput limit of 8.3 gigabytes of data. Transmittal speed is 512 Kbs bi-directionally. **Microcom's** price was $15,000 for a 2.4 meter dish, and their monthly charges are $2450 for 1Mbs down and 512 Kbs up, with no monthly volume restrictions. Microcom only requires that the administrators of each satellite link self-police their users.

VTMS determined that ***Microcom provides the best value***, based on equipment cost, operating cost, transmittal speeds, and higher dish elevation requirement. While General Dynamic's proposal provides comparable services, their satellite position requires an elevation of 0-5 degrees.

Network Server **Capital Cost: $38,750**

VTMS has been unable to find a better network server that than provided by Advanced Interactive (Ai). Ai has developed what they call the Community Axxess server, an all-in-one box that can serve up to 500 users simultaneously. One key feature of this server is its ability to manage the flow of data to the satellite link, which is accomplished by storing frequently-accessed web sites locally.

By storing web sites locally, the satellite traffic is reduced, which lowers monthly operating costs. Access to web sites is also provided more quickly when stored locally.

The satellite link operates at 1 Mbs and 512 Kbs for the uplink and downlink, respectively. Local access speed to the server is at 5.5 Mbs to 11 Mbs speeds, which is 10 times faster than satellite access. ***This is also 100 times faster than what is currently available in rural Alaska.***

Another key feature of the Community Axxess system is that it was developed to deliver content (information) to schools. The server's ability to download and store information to enhance lessons on a variety of subjects increases the ability of teachers to provide instruction. It also enhances the students' internet experience, better preparing them for the future.

Wireless Distribution Network **Capital Cost: $2,500 per APRU, $3,600 per CCS**

VTMS has developed a wireless distribution system for villages that allow mobile, high-speed connectivity, with minimal installation costs to the end user. VTMS uses equipment provided by Proxim and Cisco to provide connectivity while maintaining the security and integrity of data. The VTMS system meets HIPAA security requirements.

The distribution system utilizes wireless access points and relays (APRU) to create a series of overlapping "hot spots" throughout the village. The access points allow users to connect to the internet with an inexpensive wireless card that is installed on their desktop computer by a local technician. A user with a laptop or hand-held PDA can connect at any location in the village, a feature unavailable from other internet providers, by plugging in a wireless card. Proxim, a former subsidiary of Lucent Technologies, is a provider of access point and relay equipment (see attached supplemental information for technical information).

The access points contain relay equipment that route data to the Central Control System (CCS), which provides security to each user, and provides the connection between the Community Axxess Server, Satellite Link, and other APRUs. The speed of connectivity between the APRUs the CCS, and the Community Axxess server is 54 Mbs.

The key differences between the VTMS system and other wireless internet providers are the cost to the user for installation and mobility. Our wireless cards are priced from $35-70; theirs cost $400-700. Ours lets users roam around the village, theirs doesn't.

Another benefit of the VTMS system is that it can easily be configured to allow local cellular service. The ability to create multiple channels for data through each access point also allows health care workers to provide home-based services, a huge benefit to the elderly, those with limited mobility, and trauma cases. A detailed explanation of the Wireless Distribution System, and data security, is attached.

Optional Inter-Village Connections **Capital cost: $35,000 per village, including host village**

Proxim also provides the equipment required to establish an inter-village link. The link is established with directional antennas and equipment that allows the transfer of data between villages of 45 Mbs in each direction, simultaneously. The antennas require line-of sight.

Conclusion

The VTMS system allows Tribes to vastly increase the amount of data that can be transmitted. The quantum increase in available bandwidth will allow real-time video conferencing, voice over IP, and the ability to establish chat and conference rooms between users and communities.

The quality and durability of the Village Internet System increases reliability and reduces maintenance and operating costs to the Tribe. Maintenance and technical support can be provided both locally, and on a remote-access basis, depending on the technical capacity of the community.

The de-icing feature of the satellite link reduces the likelihood of disruption of service due to inclement weather. The signal strength from the dish to the satellite reduces the likelihood of service disruption due to precipitation. The server's warranty and service record reduces the likelihood of service disruption due to server failure. The connection scheme between the dish, server, and wireless distribution system reduces the likelihood of service disruption due to server failure. The plug and play feature of the APRUs reduces the likelihood of service disruption due to APRU failure, by both redundancy (overlapping coverage by multiple APRUs) and the simplicity of detaching a failed APRU from its mounting bracket and replacement with a spare.

DETAILED SYSTEM INFORMATION

What follows is a more in-depth discussion of the Community Axxess Server and the VTMS wireless distribution system.

CommunityAxxess is a server package for communities. It provides a complete platform of services which sits between the Internet connection and the local area network connection to the users. It provides all of the functionality required by the users, such as: caching, e-mail, web searching, web hosting, file storage, on-line backup, firewall, security, privacy ... and more.

The following are some of the major advantages of the CommunityAxxess Server:

- **Replace Multiple Boxes with one Box** – A single CommunityAxxess Server provides all the services that traditionally have been provided by multiple, separate servers. Services include: a Transparent Proxy/Caching Server, internal and external Web Servers, DNS Server, DHCP Server, LDAP Server, Print

  Server, NT File Server equivalent, , as well as firewall; and optionally, Video/audio streaming server, AppleTalk and content filtering.

- **Faster Internet Access to cached content** – the caching services of the CommunityAxxess Server stores frequently accessed files and serves them from the cache rather than going back to the Internet. This facility greatly increases access speed and frees up use of the internet connection for other uses. A three year trial with the Advanced Caching software in schools, showed very significant improvement in service regardless of the speed of the Internet connection.

- **Reliable** – CommunityAxxess Server uses a Linux operating system, with the latest RAID controller, hot-swappable hard drives, uninterruptible power supply, extra cooling, etc. to ensure that the hardware and software are as reliable as possible. Our current experience is that availability should be better than 99.99%

- **Content Provision and Content Filtering** – the CommunityAxxess Server is capable of accessing, downloading, storing and serving, any form of content required by the community. Optionally, it is also capable of preventing access to files that the Community judges are not suitable for their local use. Optionally, various content filtering services, provided by Governments and School Boards, may be employed for special users.

- **Individual services** - every CommunityAxxess user has a unique username and password for security and privacy protection. The CommunityAxxess Server also provides every user with a personal email account, web account, and file storage which the user can access using a web browser from anywhere in the world.

- **Automatic On-line backup and Redundancy** – the Community Axxess Server provides an automatic back up of all files every night, and can optionally back-up to other media for permanent storage if required.

- **Installation, Configuration and Training** – a CommunityAxxess Server is pre-configured at the factory and tested prior to shipment to the site. Installation usually takes less than a day. Thereafter, several days of training is provided on all server services.

- **Remote Fault Monitoring and Network Management** – Advanced Interactive provides a 24 hour, 7 days-a-week monitoring and reporting service, to

monitor the health of the server and services, and to provide basic utilization statistics to the System Administrator. If a fault is detected, action is immediately taken to resolve the problem.

- **Warranty and Maintenance** – Advanced Interactive, through HP provides a 3 year Warranty on the computer hardware, with a short turnaround on parts and labor. Advanced Interactive provides software maintenance through a separate Service Agreement. System and Software Upgrades are offered periodically at a reasonable, extra cost.

VILLAGE WIRELESS INTERNET NETWORK

The simplicity to the Village Wireless Internet Network (VWIN) is that it can be broken into four basic sections. The first section is the users own system, being it a permanent home Desktop, a mobile Laptop or a business Local Area Network (LAN). The second

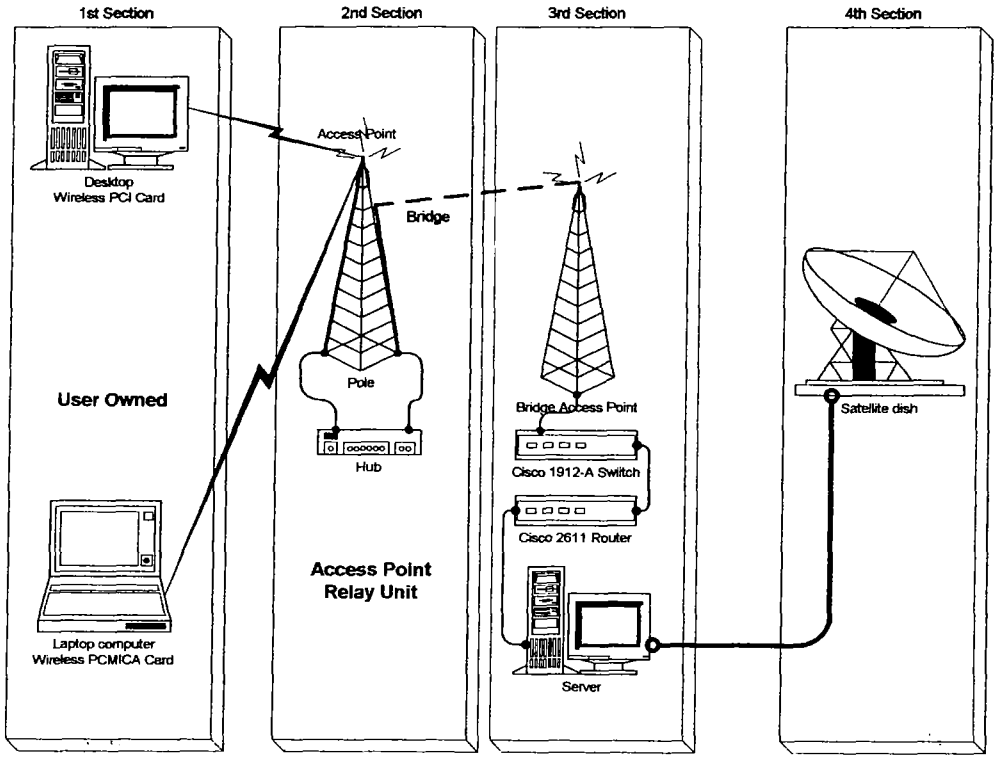


Figure 1

section of the VWIN is the Access Point Relay Unit (APRU) which is, and acts like an access point with a relay to the third section. Section three is the Central Control System (CCS) for the VWIN which controls access and data flow. The fourth is the Satellite Earth Station. The main emphases are the second and third sections of the VWIN.

The equipment in the first section (*figure 1)* is determined by the user, the only restriction is that the PCI, and/or PCMCIA card be 802.11b standard compliant with DSSS modulation. All that the control system requires is the cards MAC

address and the type of connection desired. I.e. SMC Network, Inc. has a 2.4GHz 11 Mbps Wireless PCI card that fits this requirement. SMC2602W is a PCI card for a desktop computer.

The second section *(figure 2)* is what gives this network the characteristics of adaptability with the operating tolerance for the Alaskan weather. This section is the Access Point Relay Unit (APRU) which is basically an access point Omni antenna that is connected back-to-back with a Yagi relay antenna. This unit transfers the data stream from one 802.11b channel (OMNI) to another 802.11a channel (YAGI) that is directly bridged to a central point. Each APRU is independent from all adjacent APRU except through the CCS. Multiple APRU, each with its own access point channel, is adaptable to any terrain and network topology. The APRU can be placed literally anywhere, a tree, side of a house, on a telephone pole or electrical pole, wherever there resides a power source.

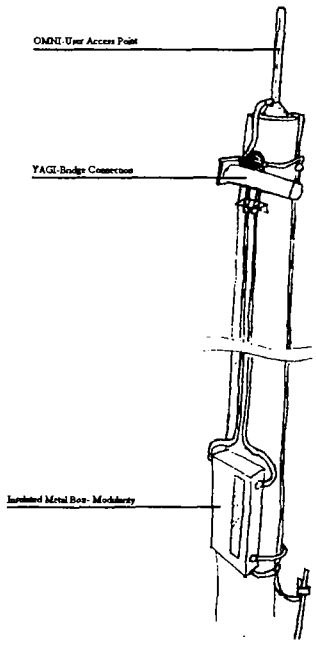
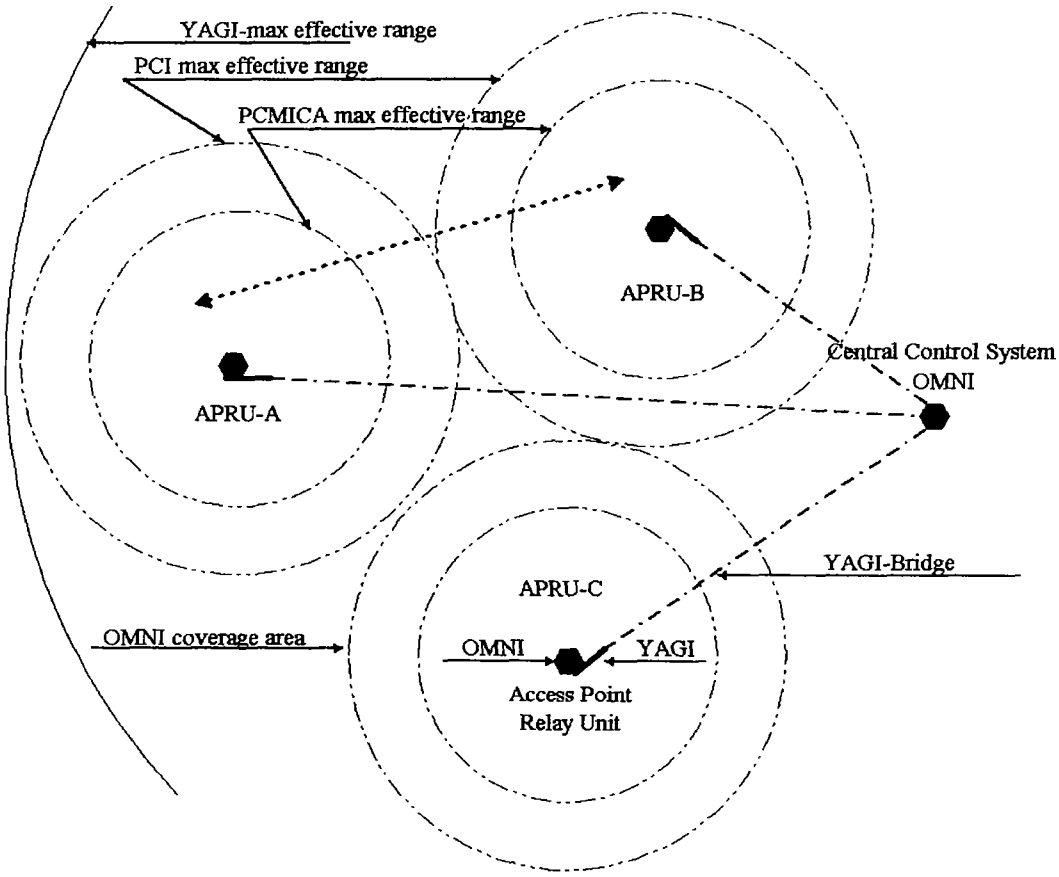


Figure 2

The wireless rate of each access point is set at 5.5 and 11 Mbps with the bridge connections between the APRU and CCS system using 58 Mbps. The difference in bandwidth coincides with the different frequencies between the access point, 2.4 GHz, and the bridge, 5 GHz; this difference in frequency also reduces interference between the two antennas.

Coverage Areas *(Figure 3)*



A user using a laptop within the access zone of APRU-A would use channel 1, a 2.4 GHz frequency channel, to connect with access point A and bridge by a 5 GHz frequency to the CCS. At the CCS the data stream from APRU-A can then be redirected back through the bridge to another computer in another zone, which uses another 2.4 GHz channel, i.e. 2; or the data stream from the laptop can be directed to the Internet. Redirecting a data stream from one APRU to another is what allows one computer to access another, thus Remote Access. Because the adjacent APRU uses 802.11b channels that are so close in frequency, a computer in the access zone of APRU-A can be moved to the access zone of APRU-B without any readjustment for the channel change, thus the computer would be mobile in a sense. If APRU-A is removed, or APRU-A malfunctions, the computers within APRU-A can access one of the adjacent APRU's by increasing its transmission range with the help of a range extender antenna. The APRU does not control any aspect of the VWIN except relay access; any type of control at this point would jeopardize security.

A reconfigured APRU at the limit of the bridge range can extend the distance and area covered by the bridge network. The extended bridge network would link through a yagi-to-yagi bridge of the APRUs to the CCS. Data from a computer in this extended system would access the network normally through access point channels of the APRU.

The third section (see figure 1) is the Central Control System, which provides access control, Remote Access Service (RAS) routing and Internet connectivity. Security and the functional aspects of the VWIN are controlled by the AI Server.

The Server can be placed in either section three or section four (see figure 1); its primary function would be telephone or RAS access for system control, Email Server, Proxy, etc. This Server is supplied by Advance Interactive Systems. Inc.

The fourth section is the Satellite link, which is supplied by Microcom. Information on the satellite link is included in the Product Information section of this report.

	Estimated Households	Dish	server	aprus	css	install	markup	video			internet monthly charge	net billed	monthly charge	video net billed
Atmautluak		10000	38750	5600	3600	8000	5000				3800	380	3400	340
Bethel Regional		10000	38750	5600	0	8000	5000				12000	1200	3400	340
Chefornak	75	10000	38750	4800	3600	8000	5000		$	70,150	3800	380	3400	340
Eek	76	10000	38750	4800	3600	8000	5000		$	70,150	3800	380	3400	340
Goodnews		10000	38750	5600	3600	8000	5000				3800	380	3400	340
Kasiguluk		10000		5600	3600	8000	5000				3800	380	3400	340
Kipnuk	137	10000	38750	8000	3600	8000	5000		$	73,350	3800	380	3400	340
Kongiganek	79	10000	38750	4800	3600	8000	5000		$	70,150	3800	380	3400	340
Kwethluk		10000	38750	5600	3600	8000	5000				3800	380	3400	340
Kwigillingok	73	10000	38750	4800	3600	8000	5000		$	70,150	3800	380	3400	340
Mekoryuk	73	10000	38750	8000	3600	8000	5000		$	73,350	3800	380	3400	340
Napakiak		10000		5600	3600	8000	5000				3800	380	3400	340
Napaskiak		10000		5600	3600	8000	5000				3800	380	3400	340
Newtok	63	10000	38750	4800	3600	8000	5000		$	70,150	3800	380	3400	340
Nightmute	47	10000		6400	3600	8000	5000		$	33,000	3800	380	3400	340
Nunapitchak		10000	38750	5600	3600	8000	5000				3800	380	3400	340
Oscarville		10000		5600	3600	8000	5000				3800	380	3400	340
Platinum									$	-		0		0
Quinhagak	137	10000	38750	8000	3600	8000	5000		$	73,350	3800	380	3400	340
Toksook	106	10000	38750	6400	3600	8000	5000		$	71,750	3800	380	3400	340
Tununak	82	10000		6400	3600	8000	5000		$	33,000	3800	380	3400	340
Tunututuliak	84	10000	38750	4800	3600	8000	5000		$	70,150	3800	380	3400	340
Yupik Immersion				5600	0	8000	5000					0		0
LKSD studios														
Bethel Site development		80000												
	1032	290000	581250	128000	72000	176000	110000	0	$	778,700	$ -	$ 88,000	$ 8,800	$ 71,400	$ 7,140
												$1,056,000	#######	$ 856,800	$ 85,680
VoIP Phones														
finance cost									$	31,148				
lease amount									$	809,848				
lease cost									$	25,915				
phones								$ -						
video								$ -						
interior village links		70000												

		Penetration rates 60%	70%	
	residential		15480	
	commercial		700	
	governmental		700	
	School			
	data	0		
	video	0	0	
	misc			
	per site 0			
		0	16880	$ -
Monthly Revenues				
$25/user				
$75/user	equip leasing		0	
	Tech support		8000	
$75/user	remote server mgt		11000	
	Satellite Access fee		0	
	Reserve account		0	
	local utilities		825	
	apru upcharge			
			19825	
Total Revenues				0
Monthly Expenses	net profit	$	(2,945)	
	Annual Profit	$	(35,340)	
			356,850.0	
	Training		165000	
	equipment		778700	
(replacement/upgrade/training)				
	project total		1,300,550.0	
	RCA grant		975,412.50	
Total Expenses	total match		325,137.50	
	local match		29,557.95	40248
Monthly				

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