

## Rural broadband and why satellite is not a viable solution.

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To: MAK@mhta.org <MAK@mhta.org>;

Cc: Mackenzie, Danna (DEED) <danna.mackenzie@state.mn.us>; Wells, Diane (COMM) <diane.wells@state.mn.us>;

Ms. Kelliher and to whom it may concern,

My name is Tim Larson and I am a resident of rural Staples Minnesota in northern Todd County, we actually only live 3 miles from town. My wife and I have worked in the Information Technology industry for over 20 years and about 4 years ago we made a decision to move our family to a rural small town in Minnesota to be able to raise our boys within a community that is built on small town values and a good work ethic. Certain values that only growing up on a farm in small town setting can teach. When we made this move high speed internet was the major determining factor as to if we could move or not. I work for Microsoft and am a home office worker so I required high speed internet at home where ever we live. Also our youngest son has Juvenile Idiopathies Arthritis and we wanted to be able to communicate effectively with his doctors located in the Minneapolis/St Paul area. Aside from those two critically important reasons we needed good internet for school work and learning, to keep in touch (video and voice call) grandparents and other relations, for TV and entertainment, leverage all the newest technology in our home from internet connected garage doors, security and surveillance systems, to digital assistance like the Amazon Echo for music and news, and lastly with two young boys we had to have the ability for them to play video games and talk /interact with the their friends both local and away.

So with all that being said prior to building our home I did a great deal of research and testing different internet connections and technology both available and in development. I gathered information about wired and wireless solutions, spoke with local telecoms, and private wireless vendors alike and after many months came down to only one viable and not economically efficient solution. We had to go with two T1 connections from the local telco company, for a total of 3mb internet speeds (both upload and download) and after negotiations I found the lowest cost possible but still pay \$400 a month just for internet.

### **Now the why copper T1's for internet versus wireless or satellite:**

All wireless plans (Verizon, ATT, etc.) were limited to 25GB a month of data downloaded and several did not have a solution that would allow my whole home to be connected, meaning that I had to use my cell phone connected to a computer to access the internet on a PC. Along with that the highest plan you could get was 25GB per month for around \$125-\$150 a month then the overage charges started to kick in at a per MB rate and the costs would go through the roof. Beside those after testing T-Mobile, Verizon, Sprint and ATT the only vendor with good enough signal was ATT and that was 2-3 out of 4 bars.

Satellite was the same issue as wireless, no matter if I looked at a business plan or a home plan there were high upfront costs and high monthly costs with a limit on the amount of data that could be downloaded a month (usually 25GB or less) then there were very high fees after that. On top of the limited data and the high costs the latency (delay) in the data travelling from the earth to the satellite and back to the earth then across the internet was such that voice, video and Virtual Private Network services (VPN) would not function at a

usable level. This automatically removed this solution for any form of work from home and trying to communicate with Doctors or relatives via video and voice. Satellite technology works for data that is not affected by latency (i.e. backhauling data from oil rigs and devices in the remote field locations) but it not to a point where it can support live voice and video for solutions needed in the home for communications like telemedicine, or live online learning let alone the occasional video call to family.

The other factor besides speed and latency for the wireless and satellite options was the amount of monthly data download. This may seem trivial but it is very easy to go over 25GB a month when watching TV and video on the internet or gaming. A prime example is that I have two boys and they play videos games. When they buy a new game and have to download it from the internet that is usually between 30GB-60GB of data to get it installed and then more as they play it. This one game alone would consume 1-2months of data allowed from a wireless or satellite vendor, and that is doing nothing else on the internet for the other 30 days of the month. That is not a solution that will work for modern day families.

Please note that there are two very key metrics in internet connections; speed and latency. For my situation 2 T1's provides 3mb of internet speeds (which is barley sufficient for me to work from home but does suffice as long as we are not doing other things on the internet) but the latency is so low that I can easily make voice and video calls for work. These is a perfect example of satellite will not work not even with faster upload and download speeds.

Having moved to this rural setting and working in technology I have become very passionate about rural high speed internet access. My family and I see if first hand every day, in kids in school that do not have access at home, and have to be driven into town in the evenings to use internet at the library. We have neighbors who home school their kids and only have a cell phone to access the internet, because in our area there is no other options other than satellite and it is not an affordable or viable solution for many types of communications.

I could go on all day long on how the lack of home broadband internet negatively affects the lives of rural Minnesotans and hinders their ability to get educated and find good paying jobs. But I will leave it at this, I am always willing to speak to anyone about these issues and my vast experience in trying to find viable options for our area residence.

**Please take this information into consideration when discussing funding rural broadband initiatives, or thinking that a satellite providers if offering a solutions that is affordable and works in our situations.**

Thank you for your time and attention.

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Chair Margaret Anderson Kelliher  
Minnesota Broadband Task Force  
Saint Paul, Minnesota

August 16, 2017

Chair Kelliher and Task Force:

Thank you for your interest in our shared vision of ubiquitous broadband access for all Minnesotans. Minnesota has achieved measurable progress in recent years through private and public investment, meaningful cross-sector partnership, and, not least, our nation-leading Border-to-Border Broadband competitive matching grant fund – which in its first three funding rounds has extended the reach of broadband to over 25,000 homes and businesses, as well as hundreds of community anchor institutions.

Of course, much work remains. We must stay focused on viable solutions to bridging Minnesota's broadband access gap – a gap that adversely impacts approximately 20 percent of Greater Minnesota and the homes, businesses, and community anchors therein.

To this end, I write to offer public comment regarding your August 16 meeting agenda discussion on non-terrestrial internet service, and in response to isolated but persistent misperceptions about how Minnesota can meet its current state speed goals to extend basic broadband connectivity to all homes and businesses by 2022 and world-class broadband access by 2026.

**Specifically, I call attention to the shortcomings of non-terrestrial internet service generally and, in particular, to the inability of satellite-based service to meet Minnesota's broadband speed goals due to limitations with bandwidth, latency, weather-induced interruption, cost and data caps, etc. Although we should welcome investment in expanded internet service and choice, we must not confuse short-term, make-shift options with sustainable, long-term solutions. Quite simply, Greater Minnesota residents and businesses deserve no less.**

Following dozens of listening sessions across the state involving hundreds of Minnesotans from all walks of life, input from respected national industry experts, and countless stories from frustrated Minnesotans looking for more reliable broadband connectivity, this much is clear to me: non-terrestrial internet service generally and satellite service in particular, while a welcome alternative where no other choices exist, are not viable long-term solutions for extending the reach of reliable, affordable broadband service. These alternatives will not reliably and affordably support home-based business, enable distance learning or telehealth applications, or empower Minnesotans to take full part in 21<sup>st</sup> century communication, culture, and commerce.

Please join me and others in pushing back against misperceptions and baseless rhetoric undermining Minnesota's commitment to reliable, affordable broadband access and those suggesting that satellite-based internet service, in particular, is the solution for residents and businesses in Greater Minnesota lacking access to the level of service they need to compete and thrive.

Best,

Matt Schmit

Dear Ms. Kelliher,

The Minnesota Broadband Task Force will be discussing the merits of wireless internet including satellite systems this week. I wanted to give you some first hand experience with satellite internet. Here is a letter to the Duluth News Tribune that I submitted this spring and it was ultimately published, shortly after the MN Broadband Day at the Capital.

While current satellite internet systems can deliver up to 25Mbps down, as I point out here, they are very expensive, with cost increasing as data plans are exceeded with a necessity to purchase additional data to get through the month.

Once people have access to fast internet, they find more and more ways to use it, with multiple family members or home based businesses all trying to use the internet at once from multiple devices. And the internet of things, such as home monitoring systems, also tap internet data. Data plan- based systems are generally much more expensive than comparable non-data plan offerings. This includes mobile wireless and satellite systems.

We currently have wireless internet from a set of towers established by our electric cooperative. The speed is up to 7Mbps down, with no data caps, and the cost is \$60 per month. The electric coop says that the technology they have and the spectrum they use does not allow them to increase the speed beyond 7Mbps. While fairly reliable (although they are currently having difficulties with their service provider and the system is very erratic (off and on), the speed provided is quickly becoming frustrating. And the distance of service from each tower is 1.5 miles, so this system cannot cover all the residents in my township, approximately half of them cannot get service. We are located at the very margin of Century Links CAF map and they have told us that they may not be able to reach us by the end of the CAF2 program. There are still many many rural areas in Minnesota that are caught between very slow vs very expensive internet access.

I urge you and the Task Force to listen to wireless and satellite subscribers, not just to the providers. And include subscribers from the hilly and conifer forested parts of Minnesota, not just the open agricultural areas, as wireless behaves quite differently "up north" than it does in southern Minnesota.

The only update I suggest from my letter to the DNT is that, previous to the MN Broadband Day, Exede offered at 150Gb plan. At about the same time, when Hughesnet began offering 25Mbps, Exede dropped it's highest data plan to 50Gb. Now, probably owing to pressure from subscribers, Exede is back to offering a 150Gb plan. At the time of my letter to the DNT, Exede only offered a 50Gb plan (in response apparently to its competition).

Thanks for your consideration,  
Janet Keough  
North Star Township

Sent to the Duluth News Tribune in April 2017 and  
published: <http://www.duluthnewstribune.com/opinion/local-view/4253545-local-view-electricity-wired-internet-needed-so-rural-areas-can-thrive>

Suggested title: Is satellite internet affordable in rural communities?

The Minnesota Legislature has invested in rural broadband for three years. They are considering additional funding; however recent speed increases in satellite internet have caused legislators to say that rural areas in the state no longer need additional broadband infrastructure. Personal experience with satellite tells me this may not be a universal answer. Cost, speed and the frustration of data plans make satellite internet less available and less useful than wired services.

I live 20 miles north of Duluth. No wired (DSL, cable, fiber optic) internet is available in our rural township. Internet is possible through fairly poor mobile (one cell tower with a weak signal), fixed wireless (tower) from the electric cooperative, and satellite, from Exede and Hughesnet. We used to get internet from Exede but switched to fixed wireless, largely because of cost and reliability (ice and snow on the dish).

Both Hughesnet and Exede offer plans with speeds of 25Mbps, with data plans up to 50Gb/month, for \$129 and \$110, respectively. It reaches us, but is very expensive, and latency, upload speeds, and data plans are problematic.

Some friends had to deal with serious illness this past winter, with months of treatment and recovery from surgery. That meant more time working and convalescing from home, and up to three people trying to access their satellite internet at the same time (trying to work via skype, connect with family, and watching internet movies). Simultaneous use slowed down everyone, and they ran through their "unlimited" monthly data plan half-way through the month; then the satellite service ramped down to effectively block a reasonable connection for a couple of weeks until the data plan renewed.

This situation is not unusual. Multiple users, simultaneously using multiple internet video or other intense systems, are common for families with school children, family gatherings, small businesses, and local community centers. Internet video is becoming very data-intensive, with HD video common for gaming and certain software, eating both speed and more and more data. The "internet of things" is real - home-based monitoring tools are now common (thermostats, refrigerators, pet minders, medical monitoring....) on top of telecommuting, video connectivity, music streaming, gaming and other data-intensive tools. Many people use the internet to access television networks! While 25Mbps speeds may be sufficient now, it won't be long (a year or so?) before it isn't enough for personal and business use, and cost-effective data plans are inadequate.

Can satellite deliver 100 Mbps at a reasonable cost by 2026 – the Minnesota state border-to-border goal? Satellite internet may bring fast broadband to rural areas, but it is very expensive and data plans are easily exceeded; satellite internet at the higher speed and data plans are far more costly than offerings in urban areas. Wired systems, e.g. DSL and especially fiber optic, offer far more affordable access to broadband and can be scaled to vastly higher speeds to meet the needs of families and businesses well into the future. Wired infrastructure is expensive to build, but so was rural electrification! Private-public funding (leveraged by the MN broadband grants) and technology partnerships are capable of bringing modern and scalable broadband internet to everyone, even in rural areas!

With satellite internet, rural folks are at a great disadvantage, especially where cost, uploads and latency matter (health care, education, business operations, for instance). Satellite may not be the short-to-medium-term panacea in rural areas. Like electricity and roads, wired internet is needed across our state, to ensure that everyone in Minnesota will be able to use convenient, affordable world-class broadband networks that enable us to thrive in our communities into the future.

Janet Keough  
North Star Township