

As I sat down to prepare this talk, I was searching for a good focal point for what I wanted to say this afternoon. In reviewing my research, and the materials I have written on this subject, I kept returning to the issues map on the Wirelessgrid web site.

And then I was reminded by Dewayne Hendricks that this year is the 100th anniversary of two watershed moments in the history of American science and technology. In 1903 we saw Guglielmo Marconi establish commercial radio service to Europe, and on December 17th of that same year the first successful sustained powered flights in a heavier than air machine were made by Wilbur and Orville Wright in Kitty Hawk, North Carolina.

On the other hand the map reminded me of a large fuzzy cloud -- fascinating to observe, but a little unclear with regards to its overall focus and ultimate goals. Quite frankly, it made me think of Bob Dole standing in front of a chart of the Clinton health plan -- large and confusing - and very hard to explain. And we all know the fate of that plan.

I would guess, if I polled this room on the best possible set of solutions for how we could maximize the utility of our global wireless communications systems, I would get a wide variety of different answers.

I suspect there are some people who would suggest a top down overhaul -- dominated by the large incumbent telecommunications interests. Other people might propose an answer that lies in a bottom up construction solution -- influenced by the hundreds of small and aggressive technology innovators around the world.

But for the sake of this conversation today, I would like to suggest a third paradigm. Assume for a moment, if you will, a totally clean slate. You are in the position of the great creator and you can design any system you believe is best for a new, 21st century approach to wireless communications. You have at your disposal cutting edge physics, technology and information science architecture concepts.

What would you do?

For the moment, I am going to assume that role and give you a sense of a few of the parameters of such a system. An

approach to this opportunity that would change forever the way that people communicate in the global community.

My guess is that there are a few comprehensive, anticipatory design principals we could all agree upon.

First would be a maximization of connectivity. A design that eliminates large segments of the population is not a solution at all. It would be, in fact, the antithesis of what we are trying to achieve. The answer we are looking for must involve greatly expanded connectivity and capacity. A system designed to allow for maximum participation.

With regards to capacity, we need to consider what we mean by bandwidth. Do we mean a megabyte or a gigabyte? For example, in California they have a goal of a symmetrical gigabyte by the year 2010.

In a democracy such as ours, the issues of connectivity and capacity must be our clear and critical imperatives.

Is there a person in this room who would pass a student who submitted a design that excluded large numbers of citizens from the full use of their spectrum, offered limited capacity, or

preferentially allotted connectivity and capacity?

Somehow I don't think so.

Next we need to look at the best efforts of the 20th century and compare them with the capabilities that are being developed for global usage in this century. To me it makes no sense to reinvent the wheel, if there are effective efforts that can be adapted and upgraded for future use.

For example, it would be useful to know what amateur radio has been doing with packet networks since the 80s.

Another aspect of what I am saying, is do we need to protect the traditional way of doing business? Is it smart, and is it prudent to use regulatory policy to protect incumbents, and thus to pick winners and losers. I think we would all agree that what we need to accomplish is the creation of a communications system that provides what is best for as large a segment of the population as is possible.

These decisions should be fact driven and not based upon ideological theories, or concerns for protecting incumbents from the winds of change

History has also shown us that the business marketplace embraces the concept of “creative destruction” as a useful, and organically necessary concept. If it didn’t, we would still be riding around in horse drawn carriages or watching black and white television.

We have reached a moment in the history of the development of our communications technologies, where it has become necessary for us to see things differently, because without a startling change in vision we will not be able to do things differently.

Please understand, however, that this is not a question of either/or -- not by any means. We must demonstrate an understanding that the answer is to look back at the last decades and incorporate the best of that period with the best of the extraordinary technological capabilities that are available to us today. We must also allow for the introduction of new technologies we are as yet unable to imagine -- for they will surely come.

We clearly need to update our vision of what communications and capacity are all about. Quite simply it is

time to apply everything we have learned in the last 100 years, including the lessons provided by the Internet and its new architectural approaches, for the use of our commercial, democratic and civil society.

And that brings us to the issue of Open Spectrum. Wirelessgrid includes it in their cloud map on the lower bottom right and refers to it as Spectrum Management.

For the last 100 years radio frequency has been treated more and more as a valuable and extremely scarce commodity to be parceled out by the government. Managing spectrum by license to avoid interference has brought us inexpensive radios, telephones, cellular service and of course the notorious bandwidth assignments for broadcast television.

In the process, the licensing model has become accepted as an unquestioned archetype, much like the Qwerty keyboard, overwhelming any other possibilities.

In fact, it is based on the then current, science related technologies of that time. It was the best available in the first third of the 20th century, but it is remarkably outdated today. For example, this approach to spectrum management was

developed before the invention of transistors, computers, radar and the publication of Claude Shannon's work on information theory.

And, as an aside, I am certain that none of us would design a modern communications systems that would ignore any of these groundbreaking achievements.

What we have learned in the latter half of the 20th century has changed all the assumptions underlying the original approach to spectrum management. Today we can design and build devices that are smart enough to distinguish between multiple signals, as well as cooperate, -- thus creating a communications model that will allow users to share the airwaves without requiring exclusive licensing.

This approach is commonly known as "Open Spectrum," as per your fuzzy cloud illustration.

Instead of treating spectrum as a rare and precious commodity to be managed by government regulation, the Open Spectrum model is predicted to allow essentially unlimited capacity, as has been shown by the BLAST experiments. This will have the effect of changing a key communications metric,

interference, to capacity. This raises the further question of a citizen's right to both connectivity and capacity.

If in fact Open Spectrum offers us more efficient use of a critical natural resource, it also has the potential to stimulate innovative services, reduce prices, foster competition, create new business opportunities, and generally realign our communications policies so that they are more consistent with our democratic policies.

In short, adopting Open Spectrum is expected to drive innovation, cooperation and societal opportunity, the essence of America's future in its third century.

In contrast to the Open Spectrum model, our current connectedness relies upon capital intensive technologies with centralized control points. The traditional broadcast media have unintentionally become the gatekeepers of our communications networks, and thus of our culture. To be able to speak to anyone, you had to have access to one of these traditional networks. In fact to be able to function in today's connected society you must have access to essentially all of these networks.



But today, of course, we are on the verge of each of us being able to connect with anyone, anywhere, whenever we want -- all the time. No middlemen. No network presidents -- just direct communications. We are abandoning our initial roles as passive consumers to become active producers.

This then is an issue of changing the fundamental way that people communicate, and thus relate -- not only in this country, but globally as well.

And make no mistake, the people of this country, and the world, are hungry for this new mode of direct personal communication. If the last few months of the American presidential campaigns have shown us nothing else, it is that -- given the opportunity -- the American people are determined to have their voices heard.

To see this difference, compare and contrast a traditional presidential web site with the Dean blog site.

And, clearly this potential extends beyond politics.

When a culture is provided with abundant capacity and connectivity not only is creativity stimulated, but new roads to

the market and beyond are created, innovation soars in all sectors of society, and risks will be taken -- in pursuit of new opportunities we can not yet imagine.

We live in a moment much like the one that energized the scientists, researchers and entrepreneurs of the early 20th century. Who could have imagined that the remarkably innovative and courageous work of Marconi and the Wright Brothers would lead to communication with ships at sea in just 9 years, the development of commercial aircraft or the exploration of space.

Make no mistake this period in the lifetime of our nation is no less extraordinary.

Open Spectrum is a model that has the power of fueling dynamic economic, political, and cultural evolutions comparable to those that reshaped the scope of the last century. Transformations that will truly make America's third century a creative, cooperative and productive moment in our country's history.

Thank you.

