Category: National Science Foundation Project (1993-2000)
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Summary of all my National Science Foundation funded Projects

National Science Foundation Project Title Organization Fiscal Year Total Award

1995 Wireless Field Tests for Education Old Colorado City Comm $446,200

1996 Mongolia Wireless Field Tests Old Colorado City $81,914

1997 Local History by Wireless Old Colorado City Historical Society $20,000

1997 Emerging Wireless Communications Workshop George Washington University $49,996

1999 Prototype Testing and Evaluation of Wireless Instrumentation for Ecological Research at Remote Field Locations Old Colorado City Communication $1,259,097

2003 Miniature Wireless Ecological Networks, Scalable - MWENS Old Colorado City Communication $99,775

Six projects over 7 years between 1995 and 2003 with $1,956,982 in NFS Grants.

Origins

Credit should be given to Dr Gordon Cook for linking up an National Science Foundation Project Manager with me in 1995 that started events that ultimately spanned 10 years and $2 million in NSF grant funding through my Old Colorado City Communications company for a series of Wireless Research projects.

I got to know Gordon Cook years before as we met through the Arlington, Virginia Computer Conferencing service MetaNet. He was originally a scholar of Russian history, and was casting about for a new profession as a good researcher with an interest in, but little expertise, in technology, when he landed a short term Research project in the Congressionally and National Science Foundation funded Office of Technology Assessment. That office undertook technology assessments for Committees of Congress in areas where Congressional staffers simply did not have sufficient technical expertise to evaluate changing technologies which might be funded or regulated by Congress.

Since there were implications for many industries and companies in the technology assessment 'findings' lots of high pressure lobbying by advocates of various technologies put him in a difficult position at times. For the area he had to 'assess' covered the then just emerging data networks - Internet TCP/IP and others - for National Research purposes. The Committee of Congress was Senator Al Gore's, who was fighting to get funding for what was called NRN - an integrated National Research Network which would link universities like MIT or Stanford to each other and government laboratories. While there is a standing joke about Al Gore claiming he 'invented' the Internet - which he didn't - in fact when he added the concept of funding, not just exclusively for high end industrial and government networking, but for that, plus for

Educational - especially University level - education the terms of the debate changed. When he inserted the letter 'N' into the funding bill a second year making it 'National Research and Education Network' - NREN - his bill got some political traction. And the funding was broadened. Gore deserves credit for that. For it started to also fund K-12 networking.

Dr Cook had been tasked in OTA to do an assessment of the state - and future - of data networking.

Cook knew of the success of Frank Odasz and my Big Sky Telegraph project which used grass roots - personal computers, modems, Fido nets, Unix and UUCP- level networking to advance K-12 scientific and math education even in the smallest and most remote rural schools. He knew that my vision was for the youngest student to be able to access the resources of the highest universities and national libraries and 'communicate' as well a collaborate with or intern - remotely - with working scientists and engineers.

So as Cook worked on his project, he often called me for my advice, not just from my ideas of what data nets could be used for in education, but also to solicit my advice how to deal with the intense lobbying he was subject to. He also had to deal with NSF project managers who reviewed the quality and scope of his work. Even though it was controversial among many college 'professors; who said, in effect "We don't want snotty nosed high school kids messing around in our pristine networks in high science." While politically conservative Congressmen only wanted data networks to be built by Corporate, not Government entities. Even Gore's Staff assistant for his NREN Bill was against dragging public K-12 education into the debate.

But Cook was able to award me a small NSF contract to make the case in his study for K-12 educational networking, .which he believed would be a good thing in the long run. Which case I made, using Big Sky Telegraph and Dr. Johnston teaching high school kids the advanced math of Chaos as examples of what kind of education for future scientists should be supported by national data networks. My report even got the attention of Senator Markey who championed public education and the role of the Department of Education. He could also see the future coming as did Al Gore. (Interestingly enough, while it was Senator Gore's father who, with President Eisenhower that funded and built the Interstate highway system that provided public, not private, highways for the body, it was the Senator Son Al who envisioned a national network that would link American's minds. So I started using notion that the Internet would be Highways for the Mind. And large parts of it should be as public as the Interstate system.

In the end I was credited for being the first advocate at the National level getting K-12 schools into the goal for national - NREN - data networks. Gore's Bill passed and IBM jumped on the dollars.

By the end of his work for OTA Cook was not sure where his next paycheck would come from. I suggested, having listened to him over the telephone for over a year citing all the 'experts' whose opinions counted, I told him that he had now so many contacts in companies, labs, universities, he could go into business for himself as an analyst of communications - Internet - technology. He took my advice and started - which is still in 2012 his bread and butter - The Internet Cook Report, which he is able to write from his New Jersey home, on his computer

connected to the networks.

Then, he, learning that Don Mitchell, a program manager in the National Science Foundation who awarded grants for science research projects, was very interested also in getting science and math into schools and K-12 students. So Cook introduced Mitchell to me. We hit it off. In part because he, an ex-Marine, appreciated my ability and drive to get things done.

Cook had told Mitchell that I was already connected up to the Internet from a server-computer at Home to my Office 1/2 mile away, with a pair of the earliest radios on the market manufactured in the US under new FCC rules for spread spectrum, frequency hopping, unlicenced bands.

Mitchell and one of his colleages, Dr Steve Goldstein connected up to my web server over the Internet from their office terminals in their NSF offices in Washington DC, the last half mile from my Old Colorado City Communications premises being wireless.

The robustness of the connection, and the fact that the last leg of the link was free, unlicensed and relatively secure, wireless, impressed them. I was clearly experimenting on the cutting edge of wireless technologies.

So Dr Goldstein flew out to Colorado Springs to meet with me in my home. After I showed and explained to him how my FCC approved system with the newest Cylink radios worked - linking my computer server at home, through thick trees, to my server in my OCCC office at no communications cost - he asked me if I would accept a $500,000 NSF grant to experiment with advanced Wireless for Education. I replied yes, but I was only interested first in connecting up very rural schools to the Net. That urban schools would be easy and relatively cheaply to connect up even by wires or fiber. He, on behalf of Don and thus the NSF, agreed.

Before I was done, my Old Colorado City Communications company, with me as the 'Principal Investigator' and - at first - with my second partner after Louis Jaffe - Larry Fox, and then when he died my junior partner daughter Rebecca Clark as OCCC's 'institutional' representative to the NSF I became the recipient, first of the $460,000 3 year grant for 'wireless education' then $1.5 million more in grant awards over 7 more years researching 'Field Science' data gathering by wireless from the jungle of Puerto Rica through the lake country of Wisconsin, on the tundra around Fairbanks, Alaska, and the deserts of southern New Mexico - to connecting up the National Library and Academy of Science in Ulaan Bataar, Mongolia to the rest of the world by low end wireless as well as satellite, Internet.

In the next several NSF Project Chapters I will describe and comment on each of the above projects.

The overall look at the several projects can be found at this URL

http://wireless.oldcolo.com (Now this web site was actively updated from 1996 through 2006, but has not been changed since then. So some links may not work aby more.)

The NSF required that I make the reports by means of a running Web Site, and present at a

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series of Conferences, rather than by just submitting traditional papers. Which was fine by me. I long since did all my work on computers and online.

National Science Foundation Project (2) and following reveals the individual field projects I pursued and my commentary on my doing them, apart from the specific tasks, results, and findings.