First International Symposium on
"National Security & National Competitiveness:
Open Source Solutions"

Remarks by Mr. Howard Rheingold

Not only am I not a member of the club, I think a lot of you are probably thinking that whoever invited me here fell off the end of the planet. I'm going to talk about things which don't have a great deal to do with what most of you have been talking about.

Well, I'm going to start with the statement that for me it is a given, and that for the rest of you it is a given, that the fruits of intelligence gathering and analysis are by definition reserved for an elite, either for those people who are given the power to have access to that information, or the people who have the money to buy that information.

The idea that it might be a resource that strange people like me might want to use, is kind of a strange idea, and I don't really make a case for that idea. I want to talk about similar givens, and similar strange ideas, that have happened in the past. In my experience, although people in audiences like this are usually pretty sophisticated about technology, and there probably are some of you that know the history I am going to talk about, a great many people don't know that some of the tools that people use today were once considered to be reserved for a tiny elite. Computers, for example.... You wouldn't have the kind of computers you have today, on your lap, for instance, if some people didn't fall off the end of the planet quite a while ago.

A couple of people in particular. This fellow by the name of Doug Engelbart, out in California, who is 1950 was an electrical engineer, drove to work at Ames Electrical Company, through what was then Fruit Grove, now Silicon Valley. And while he was driving he had a revelation, and his revelation was that if we could somehow use computers in an interactive way, and put computer information up on the screen, as he had seen information on the screen as a radar officer, then people might be able to work together to solve the kinds of complicated problems he saw coming along in the post war world.

It's hard to describe, now, how totally martian that idea was in 1950; when people were saying that four or five computers would suffice to take care of all the calculation needs of all the scientists in the world, and it was pretty universally agreed that computers were doing scientific calculations, usually for the military. Years later, in the late 50's, it became obvious you could use computers to do other things, to do data processing, to produce payrolls for large companies. But other than scientific calculations and data processing, there really wasn't any vision of

other uses for computers, not in the major computer companies, not in the military, not in the computer science departments. Englebart just stuck with this nutty idea, was not able to get anyone to sponsor it for over ten years.

Then came the early 1960's, and ARPA happened, and it happened that a fellow called JCR Licklighter joined ARPA, in what was called the Information Processing Techniques Office. And he was a guy who came into this business from left field; he was an MIT professor who was interested in psycho-acoustics. And one day, sitting in his office surrounded by all of his material, he realized that he spent a lot more time getting in a position to think, than he did thinking about his data. So he spent some time just timing what he did with his day, and sure enough, he spent a very small amount of time thinking about science, and a large amount of time arranging his data, finding it, storing it, and retrieving it; and he began to get the idea that there must be a better way to do this and he became infected with what was almost a religious revival, the idea that ordinary people could interact directly with computers; this was not the gospel at the computer companies, but there was a small computer company in Boston, called DEC, which had provided one of its computers, called the PDP-1, to some people and PDP-1 has a big round screen on it, which is something computers didn't normally have, you had to give your deck of punched computer cards to an operator, who would give you a big print-out and that's how you interacted with computers. But someone sat him down with the PDP-1 and showed him that you could, in fact, interact with a computer directly. He thought this might be a way where he could spend less time arranging his data, and more time thinking about it.

It was just fortunate for history that he happened to know somebody who hired him for the IPTO at ARPA, and he was fortunate that the ARPA policy then was to give people like him the mandate to create something totally new, even if the establishment told you it was something that couldn't be done. What he was interested in was this dream of interactive computing--directly interacting with computing machines, and not just running big calculations but using it to think about your information.

ARPA in 1963 discovered Doug Englebart burrowed in at Stanford Research Institute doing more orthodox computer research, but he had written a conceptual framework, a conceptual framework which he called "Conceptual Framework for the Augmentation of Human Intellect" and that was essentially the crazy idea that he and Lichlighter had agreed upon, which was that computers could be used to amplify the ability of human beings to think, communicate, and solve problems. Now I can tell all of you are thinking, what's the big deal about that and it is strange because it is such a given now. But it was not a given then. Access to computer resources was as restricted then as access to intelligence resources are

today.

This small, small group of people, some programmers of MIT, UCLA, Berkeley, University of Utah, really quite out of the mainstream of computer science, were given the mandate to go ahead and make these things that they personally wanted to play with--this is where time sharing came from, where computer graphics came from. Computer graphics came up as a surprise, when people were having meetings about new ways of displaying information for air defense systems, they began having seminars about this, people talking about how to put information on the screen. A young graduate student came up to Licklighter and asked if he could have some time to show some of his slides. There was a break in the proceedings. His name was Ivan Sutherland. He showed some slides on this program he had created called Sketchpad on an early computer at Lincoln Labs in which he used a screen to display graphic information, a pointing device to change information, and he used the computer as a tool to draw with. The people at that meeting, most of whom had never heard of him before, realized, essentially he blew them away, that he had created computer graphics.

Well, out there in California, Englehart was dealing with this crazy idea that if you could get compute to communicate with people using the same modalities that people use to communicate with the world, instead of the kind of coded abstractions that you find in punch cards, and computer programs. Then you could get all sorts of people, you could get educators, get students, you could get people who were solving difficult problems, engineers, architects, to use computers, as well as scientists and people doing data processing. That's where the mouse came from... By using the kind of gestures we use in the real world to communicate information, you could communicate with a computer. By combining computer graphics with a pointing device, they came up with essentially the kind of interface that we use today.

They also thought some other interesting things. They not only thought that computers could be used to amplify the ability of individuals to think, they could be used to amplify the ability of groups to communicate. At about the same time that people were starting to think about the ARPANET Englebart's group was in fact using computers for groups of people to keep a shared notebook, in which they could have a written record of their deliberations. That would be a kind of group memory for the group.

Now of course they succeeded at what they did, and people like me have computers on their desk, computers that are a lot more powerful than the mainframes that Englebart and Lichlighter were working with back then. And in fact it is a different world, and we have different ways of doing things, that simply would not be possible if we didn't have a population of people who had these

computers, and were constantly thinking of new things to do with them. And the thing about the computer, it really is a universal machine. It can do things that it couldn't do before. The problem with generations of computer designers is that they are almost always locked in to what was possible when they learned how to operate a computer. It takes some kind of crazy person falling off the edge of the planet, to come up with a new idea.

The same thing happened with ARPA. These groups of researchers around the country, were affiliated with different companies, universities, got together once or twice a year to share their results. The people at Utah on computer graphics, the people at MIT working on time sharing systems, people in LA on computer languages. They were creating a whole new paradigm for computing; they needed to be able to plug their machines together, to use applications at one site, data at another site, and a computer interface at yet another site. The idea that computers could be linked over telecommunications lines began to be discussed in the late 60's.

Twenty years ago, in the early 1970's, when the ARPANET was first started, the people who built ARPANET began to use it for something for which it was not specifically designed....to send computer data back and forth. And by the way, when the computer people talked to the telecommunications people about sending bits over wires, the telecommunications people tried to discourage them, "it was not a technology that was going to become economically feasible anywhere in the foreseeable future". But they did create packet switching to send bits over telecommunications lines. They found that they were able to operate computers remotely. But the researchers who were doing this also had the need to communicate with one another. And just as electronic mail capabilities were built into timesharing capabilities, they built electronic mail capabilities into ARPANET.

ARPANET was not built to send mail back and forth, but once they had the ability to do that, Lichlighter, and Bob Taylor who succeeded him, they not only allowed it to be used in this way, they encouraged it. They wrote an article in which they predicted that the ability to communicate with people according to shared interests, would create a medium in which cultures would begin to grow. Just as you take a petri dish, and leave it out on a shelf overnight, find something growing on it the next day... That is what happened on the net. Not only did people start sending electronic mail to each other, they started mailgroups having nothing to do with their research. I think one of the first mail groups was on science fiction. One of the first crises on the net, was the concern that the amount of traffic being sent on this topic, was going to overwhelm the network, which after all was not designed for the defense department.

John Barlow's going to talk later about just as the ARPANET was reserved for an elite, for those with power, for those with money, but broke out of that, because it was a useful tool, in the next five or ten years, people of all kinds, using computer-mediated communications, forming new kinds communities, crossing national boundaries, boundaries of gender, race, age. We don't know what effect that is going to have on society. I think it is going to have a large effect. If you look at the various occasions on what technology do, you will see they make new kinds of organization possible. The telegraph and the railroad really made the corporation possible as we know it today. I don't think anyone in business would have predicted that a new form of organization would come from a communications technology. The telephone made all of you people possible--it made the modern bureaucracy possible; multi-national corporations possible. It made possible new kinds of communities to get things done.

New kinds of communities are forming now. Institutions will be superceeded by... we don't know what they are. The fact is that people will take a tool, designed for one purpose, and they will adapt them to their own purposes, every time, if those tools help them to communicate with one another. People have an apparently endless need to find new ways to communicate with one another. When the first telephones were installed, in Philadelphia, there were 120 telephones and 110 were in businesses. or homes of owners of those businesses. It was perceived entirely as a business device.

Yet people who want to communicate with each other will find ways to do so--this is what led to national telephone system and universal service. The same thing happened with computers. When people in Silicon Valley working in garages began putting together little hobbyist computers. I remember when that happened I read about the fact that you could send away to New Mexico to get a computer, a kit that you could play with yourself, an Altair, I thought gee that's a neat idea but I had no idea what I would like to do with the computer. I didn't get one of them. That was 1974. In 1984 the first MacIntosh came out.

I think that shows you a little bit of he scale at which things can change from tool which things are restricted to a particular use, and use by a particular group to something which is really an integral part of the fabric of our society.

I think we are a more secure Nation and a more secure world because more people have access to better tools for thinking and communicating. I want to propose, although I can't give you a plan or a vision of how that might be, how the same thing might apply, perhaps, to the fruits of intelligence gathering and analysis. I know that now I can download to my desk-top computer download satellite photographs, or I can get the library of congress

catalog. I think it is possible for that same technology to reach the schoolhouses in Dakota, or allow people on all different continents to communicate raises a lot of problems and a lot of opportunities. I think we need to think about whether intelligence, like computers, and computer mediated communications, is a tool for people to think with. And if more people had access to it (intelligence), are we actually going to have a happier, more secure world.

I suspect that it is true. I hope some people out here think about ways that might be brought about. Thank you.

Comments by Robert Steele following Howard Rheingold's Remarks

I just want to emphasize, what Howard talked about regarding communities taking things further than intended. I was very impressed at a recent symposium sponsored by the Advanced Information Processing and Analysis Steering Group, of which I am a member, and which symposium I commend to all of you. Dr. Negroponte of MIT, speaking about the relative development of computers in relation to aviation, noted that the speed with which we have developed computing capabilities is akin to having gone from the Wright brothers to the 747 in two weeks. That's awesome. And I think that with what we have seen here, with the way of using open sources, the possibility of simply not having classified intelligence, while undoubtedly a little radical for the establishment, there are opportunities here, and we need to be much more open about how we do business.

I had dinner with the hacker's, and breakfast with Mr. Politi from Italy and representatives of the Association of Independent Information Producers. Out of those two dissimilar events emerged a concept for an "information minuteman" or an "intelligence minuteman". I think that is worth stressing. In your Volume I of the Proceedings you have a paper from Anthony Fedanzo, developing the concept of the citizen analyst, and another from Risa Sacks, on how to use the telephone to obtain intelligence. What I found interesting in those two different meetings, was that we basically came to the conclusion that we will never master the data entry problem. There will always be some things that aren't in the data bases, and what we have to do, as Howard points out, is use these tools to link minds so that in essence you can reach out for a near real time mind-link, and have the person on the other end generate the tailored fused data that you need to answer a specific question at a specific time for a specific policy-maker. Security for all of this comes from speed of exploitation. I commend to you Brigadier Richard Simpkin's book, Race to the Swift: Thoughts on Twenty-First Century Warfare (Brassey's, 1985). It's a superb book. It talks about the changing paradigms, not only in warfare, but in all activities. Agility, speed, openness, these have replaced weight, lethality, and secrecy.

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