

# STRL Opening Commemoration Ceremony

2 0 0 2 S T R L O p e n H o u s e

## President's Address

Katsuji EBISAWA, *President, NHK*



I always say: "Broadcasting is a culture that utilizes the latest technology." It is a public broadcaster's responsibility to constructively assimilate the results of technical innovation. NHK has always contributed to the creation of this broadcasting culture, playing a leading role through its studies of cutting-edge technologies.

NHK's Hi-Vision (HDTV) system, which is the core of digital BS broadcasting, has been adopted as an international standard for the HDTV format. Through this system, NHK's level of technical capability has become highly evaluated. Now, I see myself as a "preacher of HDTV," with the determination to diffuse the HDTV system globally. With confidence and pride, it is my hope to popularize and promote HDTV, one of the most significant inventions in the latter part of the 20th century.

At this year's STRL open house, we presented the future of broadcasting technology. Among all the exhibitions, I especially encouraged everyone to personally experience certain outstanding displays, such as the 4,000 scanning line ultrahigh-definition TV that can provide a sensation of reality higher than that of HDTV, and a flexible TV display that can be bent freely. We will also eagerly continue our research and development efforts on "human-friendly broadcasting," which will eliminate information barriers and make information easily available for anybody, at anytime, and anywhere.

I believe that the role of the public broadcaster will increase in importance, especially considering the prevalence of anxieties over the future. One of NHK's solemn missions, in a century in which true peace and dialogue are required, is to provide high-quality programs that are beneficial and enrich our viewers' lives and minds as much as possible. I expect that STRL will continue to lead in such technological endeavors, as it has done in the past.

## Congratulatory Address

Yoshihisa NAKAMURA,  
*Director-General, Tohoku  
University Research Institute of  
Electrical Communications*



As an engineer specializing in recording technology, I have a vivid memory of the great amazement I felt over the first successful PCM recording by the Science & Technical Research Laboratories in 1965. It can be said that the history of digitalization began with this advance. It is unnecessary to say that NHK has contributed widely to society in general, not only technically but also culturally.

One of my expectations for the future STRL is that it will pursue research from the standpoint of the viewer, considering how a technology will be used or what kind of benefit it will bring, in addition to considering the researcher's desire to create high-performance hardware. While I am an avid listener to radio broadcasting, the development of radio broadcasting does not seem to be as apparent as that of television. The world of sound cultivates rich imaginations, and there must be many who need radio broadcasting. There are still locations where radio broadcasting does not reach, such as in a Shinkansen super-express train or in mountainous areas. As far as this problem is concerned, I would assume that it is already possible to realize a personal or home server for radio broadcasting system using the current hard disk media. I hope that technical development with the aim of ubiquitous, "anytime, anywhere, and for anybody" broadcasting includes radio services.

I also would like NHK to build a database cataloguing its many beneficial contents, making them accessible from anywhere in the world. To accomplish this, it will be necessary for NHK to resolve certain issues, such as copyright issues, so that it can contribute to the new IT revolution.

It is my sincere hope that NHK will continue developing broadcasting systems through which people can have enriched and comfortable lives.

# Addresses (summary)



## "Opening up Future Broadcasting"

Osamu YAMADA, Director-General, NHK Science & Technical Research Laboratories

Several significant research projects, which the Science & Technical Research Laboratories have pursued over a long period of time, such as Hi-Vision (HDTV), digital broadcasting, and PDP, have almost reached completion. Appearing center stage to replace these are new research fields connected to communications networks and computer technology. Remarkable advancements are also being made in fundamental technologies dealing with imaging, recording, and display systems. Because of this and with the aim of continuing to contribute, and more fully, to advancement in broadcasting through technical development, STRL has outlined to NHK and other institutions its current research and policies governing how this research should progress over the next 10 to 15 years in the form of the "STRL Mid-to Long-Term Vision: Toward the Realization of Dreams."

This document emphasizes three major research pillars: "advanced ISDB," "content production technologies," and "future broadcasting services, and fundamental technologies."

We will continue with "advanced ISDB" studies related to seamless services by making good use of 21st century technologies (Fig-1). Through seamless services, viewers can obtain desired programs or information anytime and anywhere via various types of receivers, without the need to be aware of the differences in transmission media. Another area of research being emphasized involves studies on information-barrier-free services, with which we aim to provide rich digital broadcasting services to anybody, from children to the elderly and handicapped.

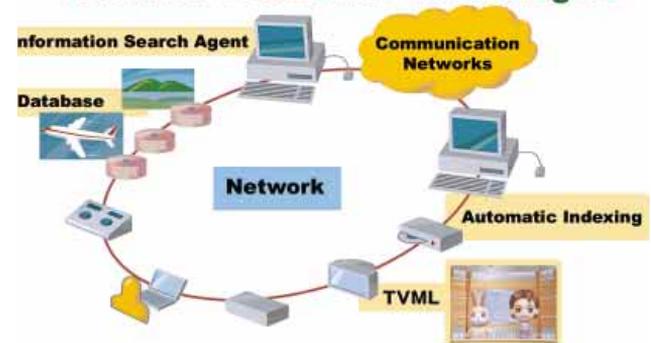
"Content production technologies" are technologies that reduce the workload of program producers, who may use them to efficiently produce programs with heightened creativity (Fig-2) and to realize new forms of video and audio expression. This research will be developed on the three basic concepts of "more

intelligent and efficient," "more flexible," and "richer expression."

Research involving "future broadcasting services and fundamental technologies" includes studies on broadcasting systems conveying an enhanced sense of reality, such as 3-D TV and the wide-screen, ultrahigh-definition image system (Fig-3); development of new frequency resources and transmission channels for new broadcasting services; advanced radio application technology for newsgathering and production; and imaging, recording, display material/devices, the basic technology of future broadcasting.

Broadcasting is a culturally creative activity based on the latest technology. As technology continues to advance, broadcasting will keep evolving. As we move into the 21st century, it is our determination to confidently meet the challenge of realizing our viewers' dreams. To fulfill these dreams, STRL should lead the way in developing the broadcasting technologies of the future.

### Contents Production Technologies



### Seamless Service



### Ultrahigh-definition System



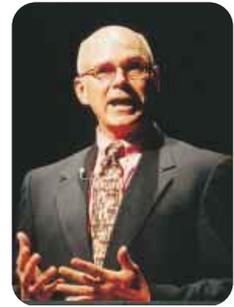
# Addresses (summary)

## "How do people make sense of new media?"

Summary of Address at NHK Open House on May 17, 2002

(Transcription from an oral presentation)

Byron Reeves, Director, Center for the Study of Language and Information, Stanford University



### 1. Introduction

My talk today is about how people think and feel when they interact with technology and media. Engineers have done an incredible job of making a reality of the idea of any content, anywhere, anytime. This is now a reality. Multimedia is maturing. Some interesting things happen, however, when we change modalities. When the information can be presented in a number of different ways, things happen as we think and as we feel. I am going to talk about some research that has some unexpected findings about how people respond in our laboratories when we study how modalities change.

### 2. Media equation

I want to first talk about the basic idea that we've been working on for 15 or 20 years. We think that the way that people process information on screens, information on computers, is fundamentally a social experience just like the experience that I would have interpersonally with someone in the audience. Many of the same things that make this interpersonal relationship successful will make the human media interaction a social one. So we say that human media interaction is fundamentally social. It's just like interactions in real life.

We actually had an artist draw a picture that represents the theory. This gentleman is having dinner with his monitor. (Fig-1) His monitor is a good friend. His monitor has been on vacation with him. They sit together and watch other things on other monitors. This is a social relationship. To summarize that social relationship, we say, we talk about the media equation. The mediated life, this relationship, is equal to, in many ways, interpersonal relationships.

What would be the implications of the media equation being true? Mediated interactions are a lot like real life. Things known about real life, things known about how I relate to other people, can be applied, in fact, we say here, stolen, to talk about human-media

relationships. We can steal and borrow these important lessons from those who know about human-human communication. And those people are the psychologists, who need to be heard along with the engineers who are inventing the technology.

Let me give you an example. If I ask you "How do you like the speech so far?" You'll likely say, "It's fine. I really enjoy it. I think I'm going to enjoy it as you continue." This is a universal politeness rule. But, we also know, as psychologists, that if you walked out into the hall and said, "Psst, how do you like the speech so far?" Hmmm, maybe some good, hopefully, maybe some bad. But mixed reviews, more honesty. That's a fact of psychological research.

Our question is, "Would people respond to a computer, a television screen, in the same way?" Here's an example of the empirical work that we do at Stanford to study this issue. Let's say everyone in the room is being tutored by a computer. The computer teaches you about technical subjects, about social relationships, and so on. After the lesson finishes, for half of the people, the same computer they've been taught on asks in an evaluation, "How did this computer do as a teacher?" And they have to respond, "Well, it did well, or it didn't do well." The other half are tutored just like the first half, but are asked to move to a second computer after the lesson. It asks, "How did that computer do as a teacher?" So, this parallels human-human interaction. It turns out that when the same computer that taught you asks you for an evaluation of itself, you are much more favorable. You say the lessons were better, the interaction was more likable, you enjoyed being in the interaction. You even think you learned more. Now the people in the room knew the computer wasn't "going to feel bad" if it was evaluated poorly, but automatically, they responded socially. We actually did the study with Stanford graduate students in the computer science department, who knew the computer wasn't going to feel bad. We tested it with engineers in Asia and Europe. They all said the same things.

This is an example of the equation between mediated life and interpersonal life. And there are some things to know about this equation. We think it's common. It happens for everyone. It's an unconscious, automatic response. Why does it happen? One of the reasons is, for humans, close counts. Media have faces, they have voices, they have characters, and people that gesture. They look and feel like real people. They interact. There is contingency, If I do something to the machine, it does something different back to me, based on what I did to it. That's very similar to interpersonal interaction. The human brain is not specialized for 21st Century media. The human brain evolved over thousands of years to



Figure 1: The Media Equation

respond to very primitive cues in our environment. And those are the responses that we bring to all of the technology that all of you are inventing. Old brains engage new media. We have no choice but to bring these old brains with us when we process media.

What are the implications of this for multimedia life? Human-media interactions are social. And changing the modality can change the social responses. And if designers keep this in mind, they can avoid some problems and they can benefit from some opportunities.

### 3. Changing Screen Size

We're interested in how people respond socially. One of the words we use to describe this response is "arousal." Arousal means the intensity of feelings, either good feelings or bad feelings. It means the excitement we've got going, the readiness for action. Arousal is a very important response in humans because it's the engine that gets us to do things to save ourselves. So arousal can happen when content is either positive or negative

We have a primitive response to fire, to someone threatening us, to naked people, to seeing blood. All of these are very basic responses. You don't have to learn much about how to respond, just because you're human.

Now I want to show you the concept of display size, thinking about arousal. We chose three different screens: a large 60" display, a 22" display, a small 3" display. After six seconds of baseline measures, the pictures come on the screens. (Fig-2) The large screen is significantly, substantially, more arousing than the other two screens. And the opposite may happen as well. The traditional large screen content may be less exciting when it's downsized.

### 4. Changing from a PC to a TV

We know that the same content can be displayed on a PC or a television. What effect does that difference have on how the information is processed up here (in the brain), on how much people like it? We thought the PC may have the role of being serious and that TVs may have the role of being casual.

For our test we got identical monitors. We put a keyboard with a mouse in front of some to make them seem like a computer and put an old antenna on top of the others to make them seem more like a television. Then we had people watch comedy and trade stock on both a 'computer' and a 'television'. When they watched comedy on the television, it was a lot funnier than when they watched it on the PC. When the stock trading was done on the PC, people thought it was a lot more intelligent, and the information was more trustworthy. But, it was the same stuff. The only difference was the role that was assigned to the technology.

Thus the expected role is important, just as social roles are very important to us in interpersonal relationships.

### 5. Changing Environments

The change here is nothing more than the room where multimedia presentations occur. We were especially interested in the office versus the living room. We had people make choices about what television programs they were going to watch using two different interfaces and in two different places. One of the interfaces was an Excel spreadsheet, the other, a program guide that had an interactive character that

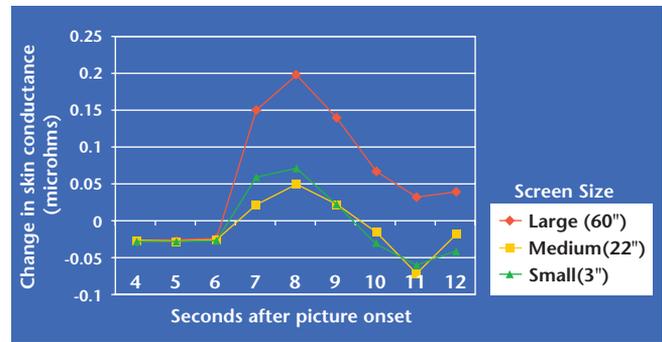


Figure 2: Different Arousal Levels for Different Screens

asked you questions about what you wanted to view. We found that the character program guide was liked much more in the living room and the spreadsheet interface was liked more than the character interface in the office. The office is the place where we need to be serious. The spreadsheet goes well there.

### 6. Changing from screen characters to robots

Another reality of this multimedia environment is that we can now use robots along with the television screen, to bring more life to the interaction. Similar contents and stories can be delivered by TV characters or by robots. We've done several studies on this. Kids like the robots better. When the robot moves, kids like it even more. Children learn more from the robot; they pay more attention; they are a little bit more aroused and excited.

In addition, we did a study with children and Aibo asking about whether or not Aibo was treated like a real dog. Here's a summary of what we found. It is not OK to hit Aibo. Several kids said. "It would really be bad to erase Aibo's memory." Aibo is a real social actor in a child's environment.

### 7. Virtual Service Representatives for PC sales on the web

I'll show you another piece of technology that we've been working on, one that displays pictures of humans in business transactions. These are virtual service representatives. We actually did a pilot of this on a web site of a PC manufacturer. A character pops up; it's scripted and chosen to match the band; it helps you configure a computer. The character makes recommendations and advises you. People respond more positively. They are much more likely to add it to the shopping cart; they're much more likely to do business.

### 8. Conclusions

To study how to build this stuff and how people respond to the technology is an inter-disciplinary effort. It's really different than a lot of the media inventions we've done in the past.

Technology is hard to use. How can I make it easier? How can I use natural forms of input and output? Natural language processes, speech dialog systems, there are many examples of those here in this building as well. What are the social and emotional responses that are important? The answers to these questions are in a 'sandwich' between technology or computer science, and psychology. At Stanford, we're working with industry and with every department across campus to bring new interdisciplinary teams to life in a program named Media X to find these answers. Thank you very much for the opportunity to speak with you.