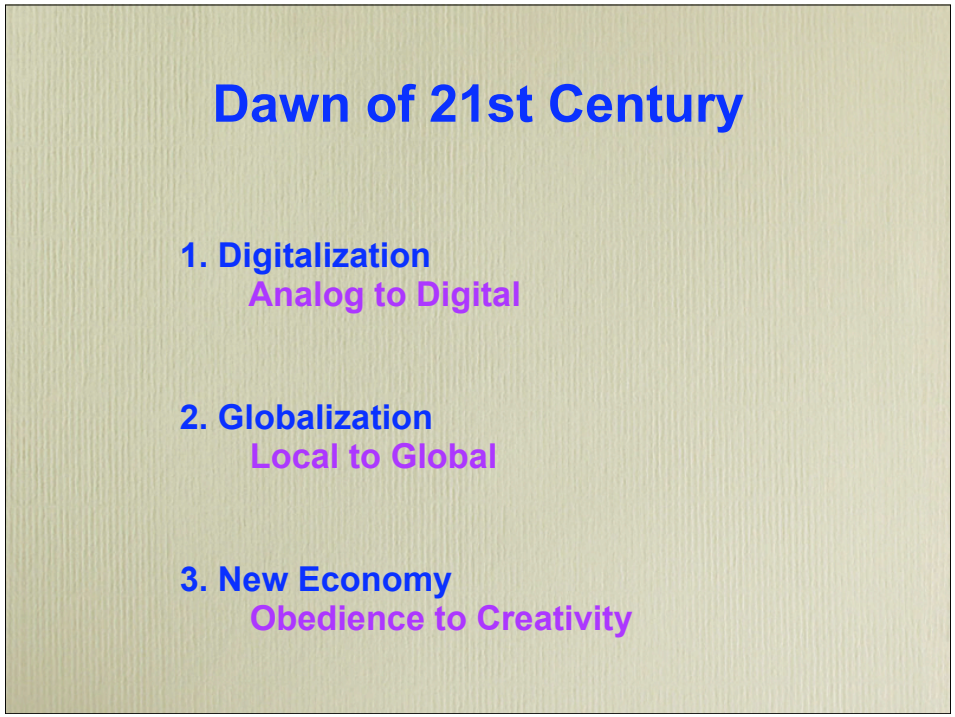

1

**Distinguished delegates, Ladies and Gentlemen.**

**It is my great honor and privilege to have this opportunity to describe our "Global University System (GUS)" project along with "Globally Collaborative Environmental Peace Gaming" project, for which I have been working in the past three decades. My sincere gratitude goes to Ms. Jennifer Hedrick, Mr. Charles Eke and other conference organizers for their kind and generous invitation to me.**




2

**Circuit switching to packet switching -- "mind-change," particularly of bureaucrats as Machiavelli once said almost a half millennium ago.**

**Raw material of industrial age was tangible, the raw material of knowledge age in the 21st century is IN-tangible.**

**There is NO economic theories for the latter -- incidence of Nobel economic laureate of Columbia University.**

**Dr. Kaisa Kautto-Koivula of Nokia said in her paper in Part II of the book that "The biggest barrier for new development of Human-Centric Knowledge Society is our Industrial Age mindset!"**

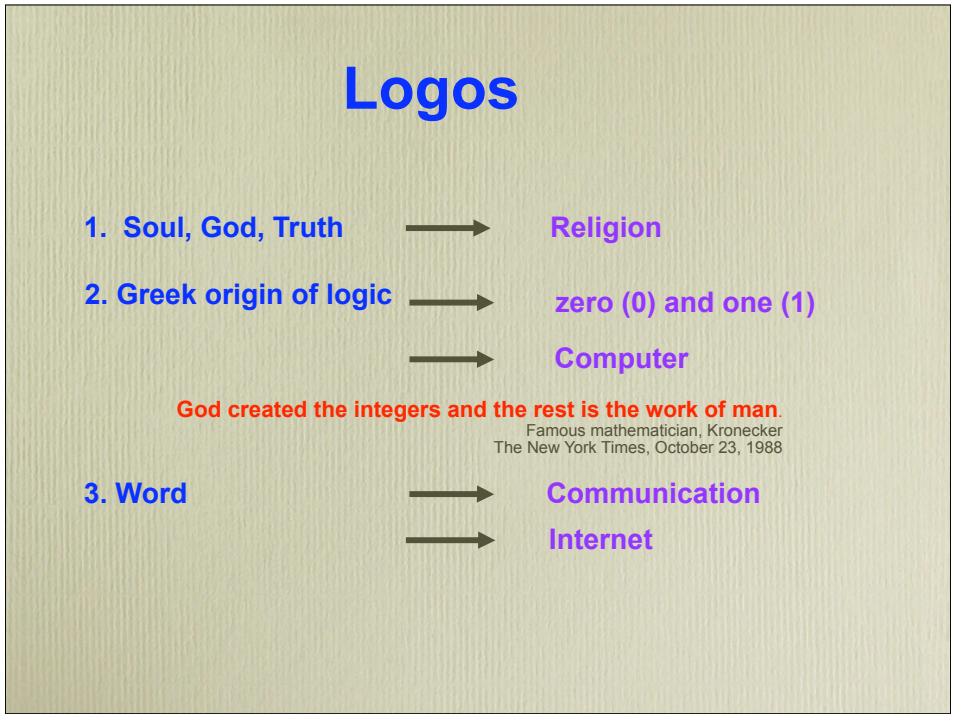
**Creativity is the province of Homo sapiens. We live for future, not in past. Science and technology open the future. However, the application of new technology often meets with "Creative Destruction" -- the famous words by Joseph Schumpeter.**

**Here needs good understanding of traditions and culture, and strong belief in scientific and moral principles. This is because the interchange of creativity makes possible an international understanding and mutual appreciation that can lead to global peace.**


3

**I remembered this verse of the Book of John in the New Testament, which I learned in ancient Greek in my college age.**

**Dr. Joshua Lederberg, President emeritus, Rockefeller University and Nobel Laureate in Genetics, once said to me during a seminar at Columbia University that this phrase is his psyche.**






**The word "Logos" has the meaning of "Soul," "God," and "Truth," in religion.**

**It is the Greek origin of the English word "logic," -- like "Yes," or "No," and zero (0) and one (1) which are the basis of computer.**

**The "Logos" was also translated to "word" in King James Bible.**

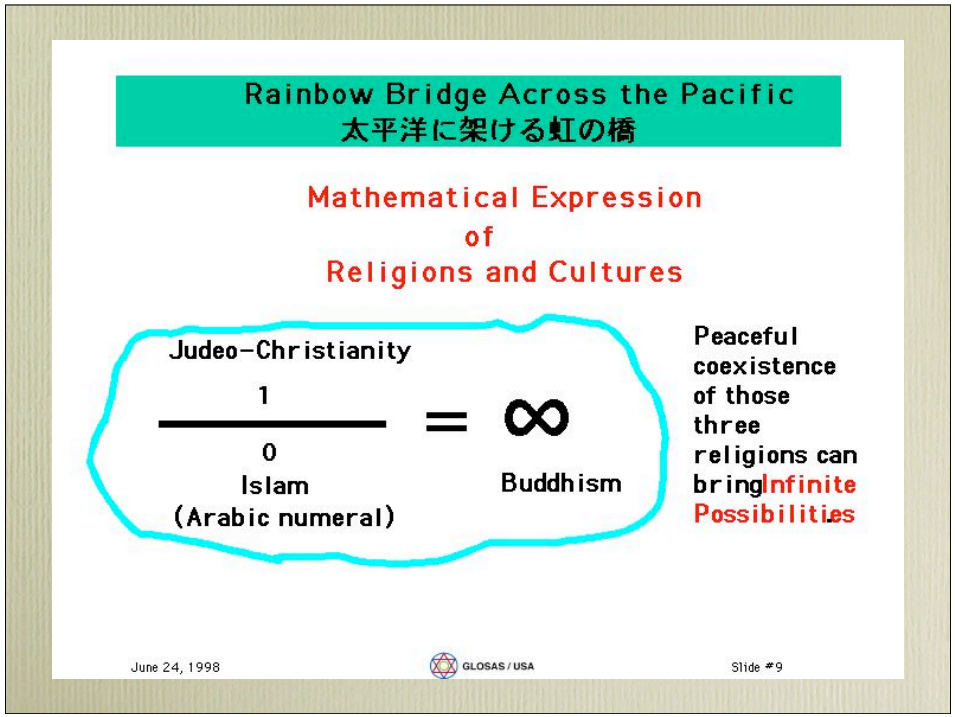
**I thought that it was erroneous translation and it should have been translated to "logic."**

**However, I realized that the "word" is the basis of communication which is the basis of human understanding for world peace. Internet is now becoming the future of telecommunications.**

**Almost a quarter century ago, I helped to extend the predecessor of Internet to various overseas countries, particularly to Japan, etc., (the so-called "Closing Digital Divide" nowadays), and also de-regulated the Japanese telecom policies for the use of email. This was emulated in many other countries -- nowadays, over 750 million people use email around the world.**

# Five Pillars of Information Age

- Numbers are used to represent all information.
- These numbers are **1**s and **0**s.
- Computers transform information by doing arithmetic on these numbers.
- Communication systems move information around by moving these numbers.
- Computers and communication systems combine to form computer networks. Computer networks are tomorrow's information infrastructures, which in turn are the basis of the Information Marketplace.






**Judeo-Christianity is Monotheism with One and Absolute God.**

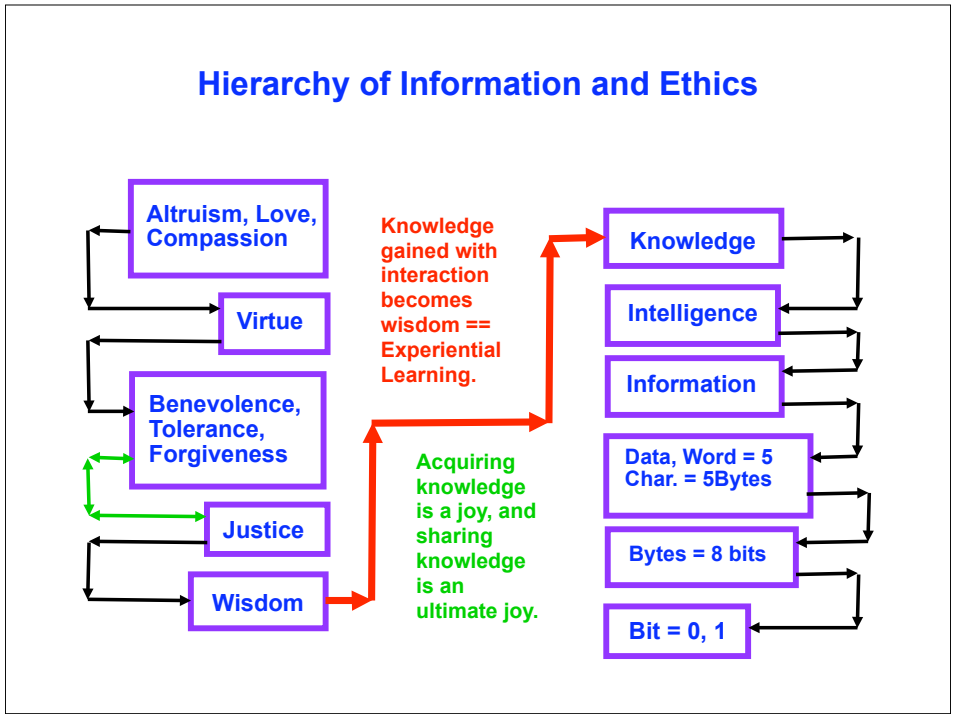
**Arabic countries introduced the concept of Zero (0) with Arabic numeral to the western world which was invented in India.**

**This is in contrast to Roman numeral -- which is almost impossible for multiplying, say, 14 (XIV) by 8 (VIII). Therefore, this introduction was the most significant contribution of Arabic (Islamic) countries to the scientific advancement of the western world.**

**At the time when Julian calendar was set by Julian, Emperor of Rome (361-363), there was no zero (0) so that the new millennium was started with one (I). This was corrected by Gregorian calendar by Pope Gregory XIII in 1582 which starts a new millennium with zero (0). As you may recall, some countries celebrated the start of the Third Millennium at the new year's day of 2000, and others of 2001.**

**If you divide one by zero, you will get infinity which is the symbol of Buddhism.**

**This may be said as Utsumi's equation in comparison with Einstein's $E=MC^2$ -- my big joke?!**






**Dr. Hallan Cleveland, former president of the University of Hawaii and former US Ambassador to NATO, once wrote that 8 bits become one byte, 5 bytes become one word or data, which becomes information. Information selected with intelligence becomes knowledge.**

**We then expanded its hierarchy as depicted above. As shown, each item is controlled by the one above. However, Justice and Forgiveness/tolerance has to be two-way interaction.**

# Knowledge and Wisdom

- **“Knowledge is power.”**

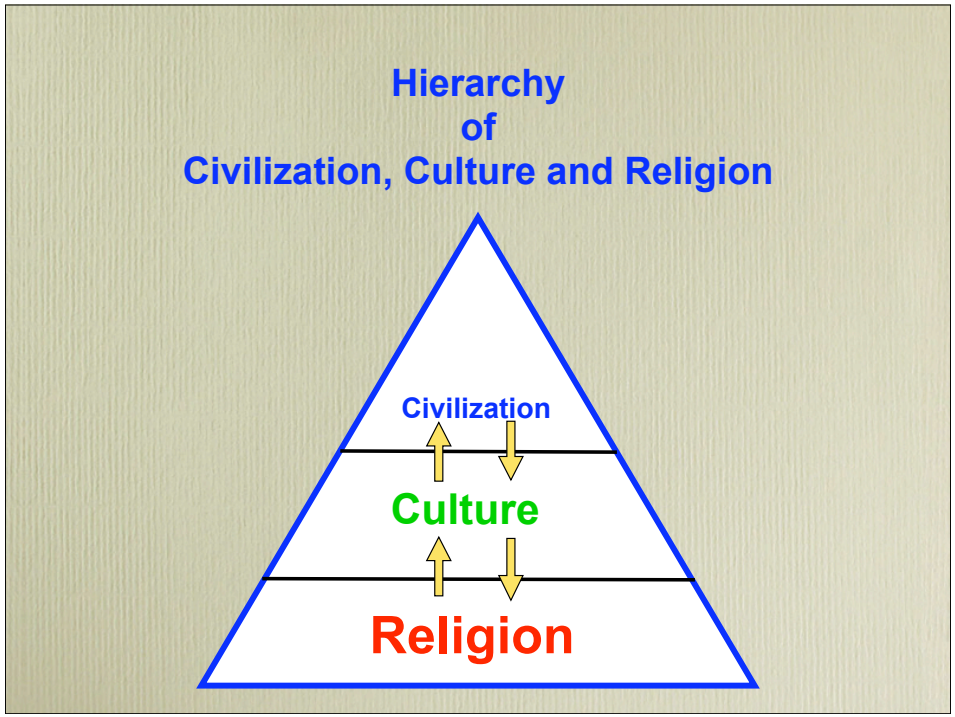
  Francis Bacon

- **“Knowledge cuts up the world; Wisdom makes it whole.”**

  David Maybury-Lewis

  The New York Times Book Review (Date Unkown)

- **Analysis and Synthesis**

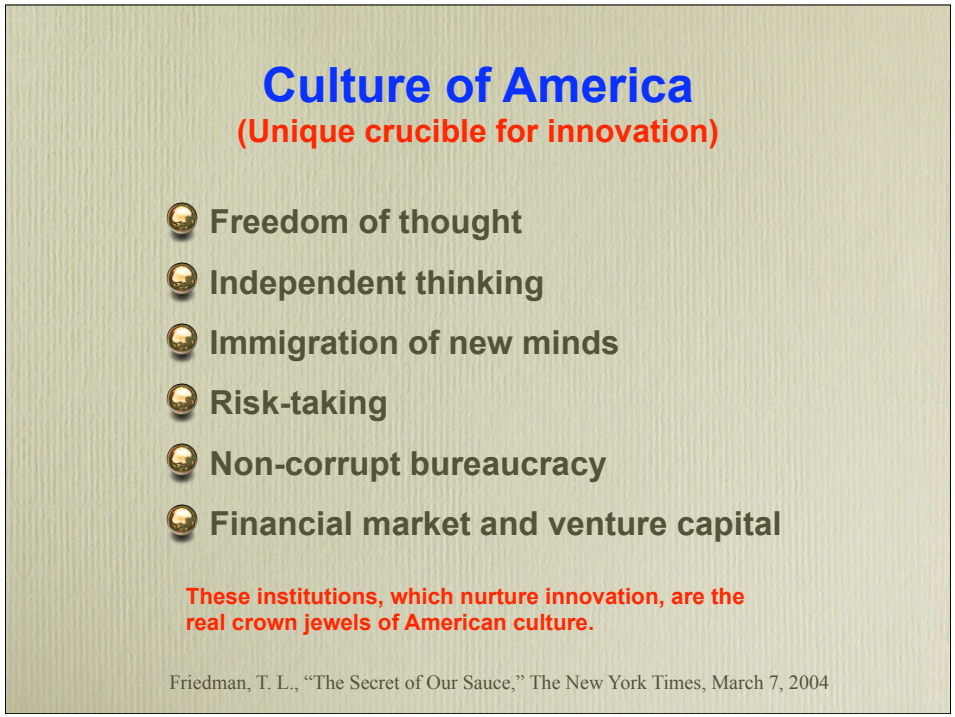





**Portugal was the first western country Japan dealt with almost a half millennium ago. In 1549, St. Francisco de Xavier was sent to Japan by John III of Portugal to spread Christianity and gained many converts to the Roman Catholic Church, but, alas, after obtaining the technology of musket gun, Tokugawa Shogunate banned the spread of Christianity -- subsequently, Christian population in Japan is still only less than 1% even after a half millennium since Xavier's introduction.**

**This is the first precedence of the Japanese technology transfer pattern, i.e., cream-skimming civilization (the fruits of science and technology), but not importing culture nor religion. Although I admit that this is a provocative statement, this pattern is, I believe, the cause of the serious doldrums of current Japanese economy after bursting its bubble almost a dozen years ago.**

**Religion = Root,**
**Culture = Trunk,**
**Civilization = Flower and Fruit. -- Need of cross polination for a new global society.**






America is so much more innovative a place than any other country. America allows you to explore your mind. America is the greatest engine of innovation that has ever existed, and it can't be duplicated anytime soon, because it is the product of a multitude of factors:

* Extreme **freedom of thought**,
* An emphasis on **independent thinking**,
* A steady **immigration of new minds**,
* A **risk-taking** culture with no stigma attached to trying and failing,
* A **non-corrupt bureaucracy**, and
* **Financial markets and a venture capital** system that are unrivaled at taking new ideas and turning them into global products.

**These institutions, which nurture innovation, are the real crown jewels of American culture.** The whole process where people get an idea and put together a team, raise the capital, create a product and main-stream it -- that can only be done in the U.S.

The U.S. tech workers must keep creating leading edge technologies that make their companies more productive -- especially innovations that spark entirely new markets.

This is America's real edge.

# What is peace through culture?

**The word "culture" is deriven from the two words "cult" and "ur." "Cult," of course, means cultivation. "Ur" is an ancient Chaldean term meaning "light" -- the creative aspect of the universe. Hence, culture is literally the cultivation of creativity.**

**Peace is more than just the absence of war. Just as it takes acts of war to make war, it takes acts of peace to make peace. Peace, then, is a structure of positive acts of creativeness that are carried out in a spirit of high idealism.**

> **"Genuine peace must be the product of many nations, the sum of many acts. It must be dynamic, not static, changing to meet the challenge of each new generation. For peace is a process -- a way of solving problems."**
>
> John F. Kennedy

## Principle of Global E-Learning

- Collaborative Learning
- Experiential Learning
- Objective Learning
- Autonomous Learning

# Chinese Proverb

**When I hear, I forget.**

**When I see, I remember.**

**When I do, I know.**

**Knowledge applies with interaction becomes wisdom.**

## Background and Rationale

- The Internet, with its rapidly expanding and improving infrastructure, will be the main telecommunication media of tomorrow.
- The full potential for achieving revolutionary advances in education and healthcare in developing countries cannot be realized with the currently available information delivery infrastructure and at currently prevailing market prices.

## Background and Rationale II

- Improved e-learning requires much better ways of presenting information and of enabling learners to interact with facilitators to enable the learners to process that information into personal knowledge.
- What is needed is both high quality audio/ video delivery and high quality interactivity.
- Developing countries need broadband Internet via international satellite and fiber-optic cable.

# New ways of learning

- Online courses and collaborative learning provide means of improving the quality of learning opportunities, by supporting schools and institutions an environment not dependent on space or time.
- This requires small classes mentored by skilled faculty members.

## Experiences of multimedia instruction

- Constraints imposed by the Internet
- Evolution of Web based delivery platforms
- Students learning culture
- Multimedia enhancements
- Interactivity and promoting collaborations
- Synchronous dimension

## Research findings

- Learning networks can be as effective or more effective than traditional classrooms, in terms of access and learning outcomes
- Collaborative learning designs are more effective for online learning than individuals working alone with materials posted online

## Problems and promises

- Experience demonstrates that collaborative ventures are unlikely to be succesful, even where they are well financed, and especially when they are based on existing providers and reliant on re-engineering of existing teaching and learning practices.
- A spirit needed that recognizes the values of a multicultural world, civil society and participation and empowerment of people.
- Digital literacy

# Goals of GUS

- eLearning
- Joint research, professional development and knowledge-building
- Data- and media-intensive exchanges
- Globalization of employment opportunities

# Objective of GUS

- Construction of global broadband Internet networks
- Development of teaching materials
- Global network of facilitators

## Philosophies and Principles of GUS

- Transcultural, globalwide initiative
- The GUS to demonstrate moral leadership
- Priority on academic freedom
- The GUS to stress quality education
- Initiative to be shared with students
- Transnational collaboration on research
- Commitment to openness
- Toward transcultural unity-in-difference

## Global University System (GUS) - A

**The Global University System (GUS) is a worldwide initiative to create telecommunications infrastructure for access to educational resources across national and cultural boundaries for global peace.**

**GUS aims to create a worldwide consortium of universities to provide all world citizens, with special emphasis on the underdeveloped world, with access to 21st Century education via Internet technologies.**

# Global University System (GUS) - B

**The GUS works in the major regions of the globe with partnerships of higher education and healthcare institutions.**

**Learners in these regions will be able to take their courses from member institutions around the world to receive a GUS degree.**

**These learners and their professors from partner institutions will also form a global forum for exchange of ideas and information and for conducting collaborative research and development with emerging global GRID computer network technology.**

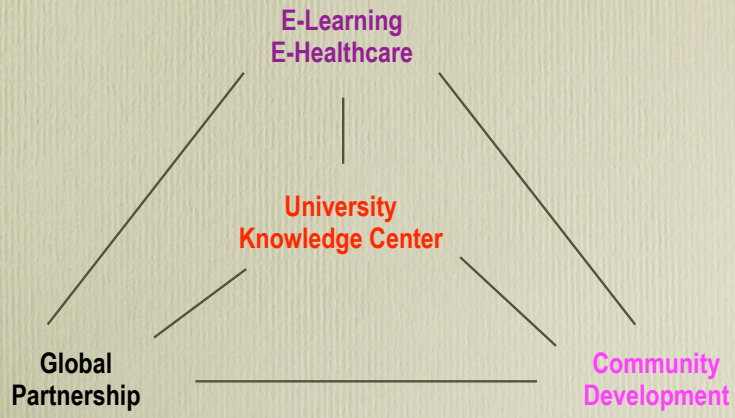
**The aim is to achieve "education and healthcare for all," anywhere, anytime and at any pace.**

# Expected Benefits

It is expected that GUS will provide the following benefits to students and participating universities:

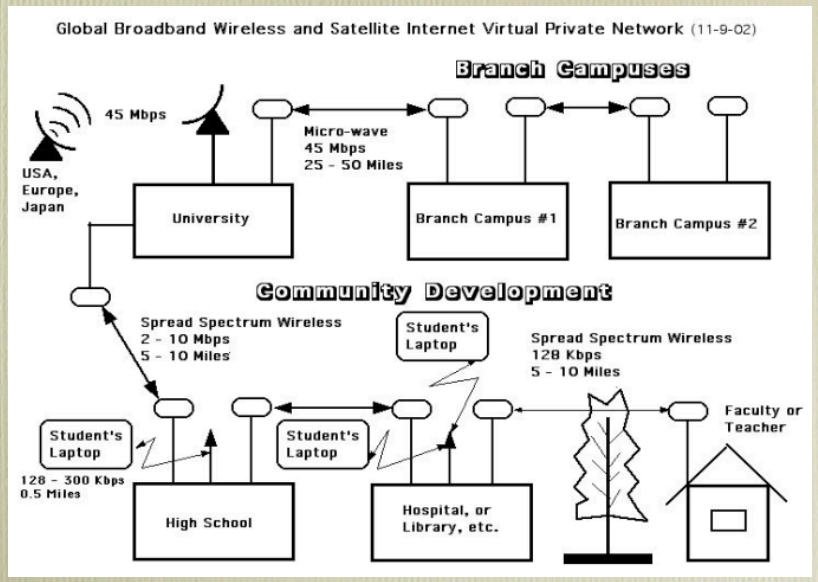
- Broadband Internet connection, supporting modern distance education via the World Wide Web.
- Help member universities build a network of facilitators to support e-learners.
- Learners may take courses from different member universities, obtaining their degree from the GUS, thus freeing them from being confined to one academic culture of a single university or country.
- Learners and faculties can promote the exchange of ideas, information, knowledge, and joint research and development of Web-based teaching materials.
- Researchers in developing countries can partner with colleagues in more advanced countries, and perform joint collaborative research and development with the use of virtual reality/virtual laboratories for experiential/constructive learning and creation of knowledge through emerging global GRID computer networking technology.
- Learners, faculties, and public policy makers can promote community development and many other advances at a local, regional and even on a global scale.

# University: Leader of Community in the Knowledge Society in the 21st Century



## Global Broadband Internet (GBI)

Virtual Private Network with QoS






**1. Satellite linkage:**

**GUS will be based on regional satellite hubs, typically located at a major university, that connect via high-speed satellite (~ 45 Mbps) to educational resource cites in the E.U., U.S., and Japan. In a sense, the regional satellite hub is to be the major Internet Service Provider (ISP) for not-for-profit organizations in the region, and the gateway to the outside world.**

**2. Microwave linkage:**

**Regional hubs link to branch campuses or other regional educational institutions via micro-wave (~ 45 Mbps) over relatively short distances (25-50 miles).**

**3. Community Development Network:**

**Communication from the hub and branch campuses to local sites, over distances up to 10 miles, is to be achieved by spread-spectrum wireless (~ 2-10 Mbps) Internet networks, which do not require licenses in most countries.**

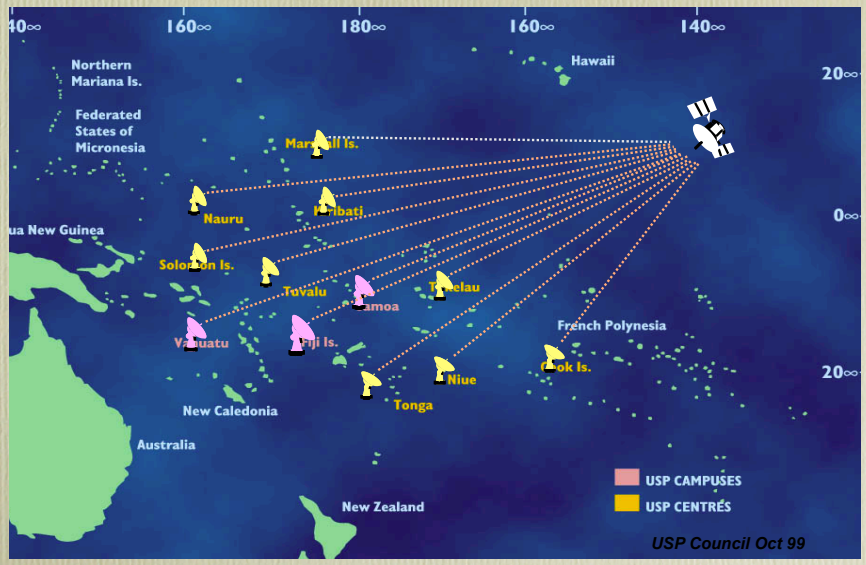
**4. Wi-Fi connection:**

**The buildings with a broadband Internet connection will then also become relay points for the low-cost "Wi-Fi (wireless fidelity)" networks at 10 Mbps that are now rapidly appearing in Japan, USA and Europe.**

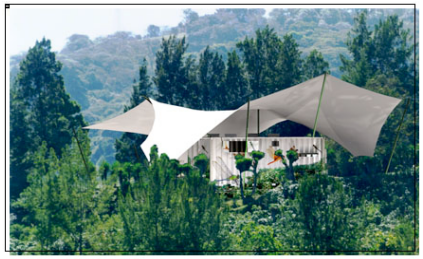
---

**This advanced wireless communication with laptop computer will make e-learning possible for anyone, anywhere, and anytime with capabilities of Internet telephony, fax, voice mail, e-mail, Web access, videoconferencing, etc. This is not only to help local community development, but also to assure close cooperation among higher, middle and lower levels of education.**

# USPNet VSAT Network

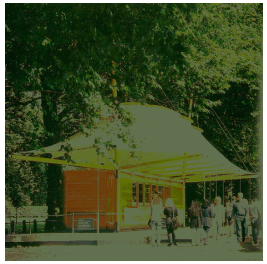


# LINCOS (Little Intelligent Communities) or "Unwiring the World"



Foundation for Sustainable Development of Costa Rica
Institute of Technology of Costa Rica
MIT Media Lab
University of Rochester

**Hewlett-Packard**, Microsoft, FTL Happold, Northsails, UTC, Becton-Dickenson, Wyle, V-Tel, **Tachyon**



*James Sheats, HP Labs*
*Technology for Sustainability Initiative*

11May 1999

# Digital Town Centers

8-10 Computers
2 Printers, 2 Scanners
Cell phone base station (15 mile radius)
Smart card reader
Medical diagnostic bay
Analytical equipment as appropriate
External large screen (when available)
VSAT satellite connection

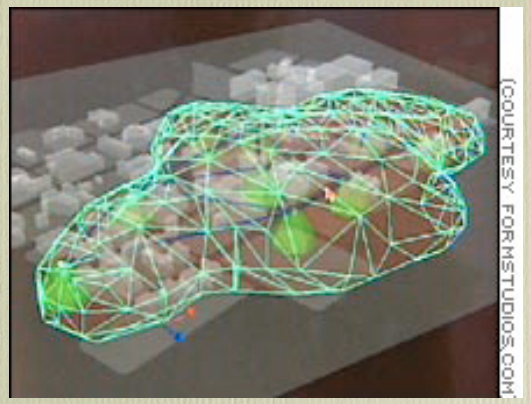
Purpose: to provide a multi-purpose information center for isolated regions, with high-speed (40 Mb/s) internet access and integrated local wireless communications, at affordable cost for developing nations

Telemedicine
Agricultural extension services
Environmental monitoring
Education

Computer Lab
Electronic Commerce
Banking
Digital Services

# Microwave Network among Hawaiian Islands

# WiFi Cloud




This 3-D animation shows the wireless "cloud" over downtown Athens, Georgia. The project is aimed at attracting new users and creating new content for wireless laptops and PDAs.

"Wireless 'cloud' may offer silver lining; Or is it just 'pie-in-the-sky' technology?
CNN.com/SCI-TECH; July 31, 2002
http://www.cnn.com/2002/TECH/science/07/31/coolsc.wireless.cloud/index.html

# Inventor of Wireless

## Ms. Hedy Lamarr

### The Improbable Inventors of Frequency-Hopping Radio

She was gorgeous, glamorous and talented. And she had a mind for technology. In 1941 actress Hedy Lamarr, along with the avant-garde composer and musician George Antheil, filed for a patent to cover their "Secret Communication System," a device designed to help the U.S. military guide torpedoes by radio signals that would continually jump from one frequency to another, thus making enemy interception and jamming difficult.

Born Hedwig Maria Eva Kiesler in Vienna, Austria, Lamarr may have gotten the idea of "frequency hopping" while she was married to Fritz Mandl, an armament manufacturer who sold munitions to Adolf Hitler. Through a marriage arranged by her parents, Lamarr was Mandl's trophy wife, and she accompanied him to the many business dinners and meetings, where, unbeknownst to the participants, she silently learned about Axis war technology. After four years with Mandl, Lamarr, a staunch anti-Nazi, fled to London, where MGM's Louis B. Mayer "discovered" her and convinced her to move to the U.S.

In Hollywood she met Antheil, who helped her figure out a way to synchronize the frequency hopping between the radio transmitter and receiver. Their invention, which they gave to the U.S. government for free, called for two paper rolls, similar to those used in player pianos, punched with an identical pattern of random holes. One of the rolls would control the transmitter on the submarine while the other would be launched with the receiver on the torpedo. Though ingenious, the device was deemed too cumbersome for use in World War II.

Still, the seminal idea of frequency hopping lingered. By the late 1950s U.S. Navy contractors were able to take advantage of early computer processors for controlling and synchronizing the hopping sequence. Since then, the U.S. military has deployed more sophisticated techniques with ever faster processors in costly, classified devices, including satellite communications systems. And today the technology has become widespread in cell phones and in personal communications services (PCS), among other civilian applications. —*D.R.H.*

HEDY LAMARR, the Hollywood actress, was the co-recipient of a patent (*inset*) for basic technology that is now widely used in cell phones and personal communications services (PCS).

"Spread-Spectrum Radio" by David, R. Hughes and Dewayne Hendricks, *Scientific American*, April 1998, p 94-96

# Mobil Learning Era

**The evidence is overwhelming that mobile learning (m-Learning) is beginning to take hold:**

- Over 50 percent of all employees spend up to half of their time outside the office.
- More than 75 percent of all Internet viewing will be carried out on wireless platforms by 2002.
- Mobile devices will outnumber landline PCs by 2002 and exceed the 1 billion mark the following year.
- More than 525 million web-enabled phones will be shipped by 2003.
- Worldwide mobile commerce market will reach $200 billion by 2004.
- There will be more than 1 billion wireless internet subscribers worldwide by 2005.

# Connotations

| | |
|---|---|
| ❊ WIRED | ✲ WIRELESS |
| ❊ Slave | ✲ Freedom |
| ❊ Crime | ✲ Flexibility |

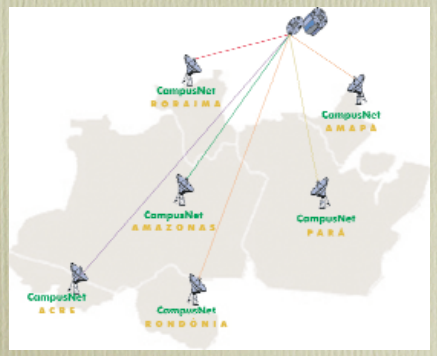
# Outsourcing


The New York Times, March 14, 2004

# Amazon Project

## Deployment of Broadband Internet

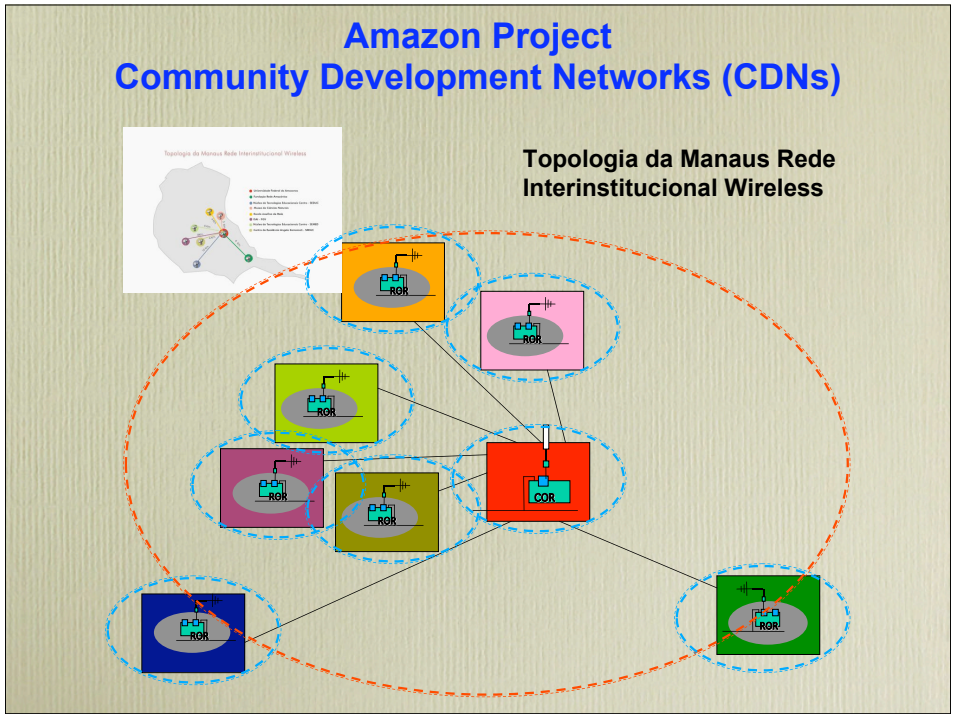
**CampusNet Amazonia will interconnect Multimedia Resource Centers (MRCs) of all six Federal Universities in the Amazon region by broadband satellite Internet.**



# Amazon Project

## Deployment of Broadband Internet

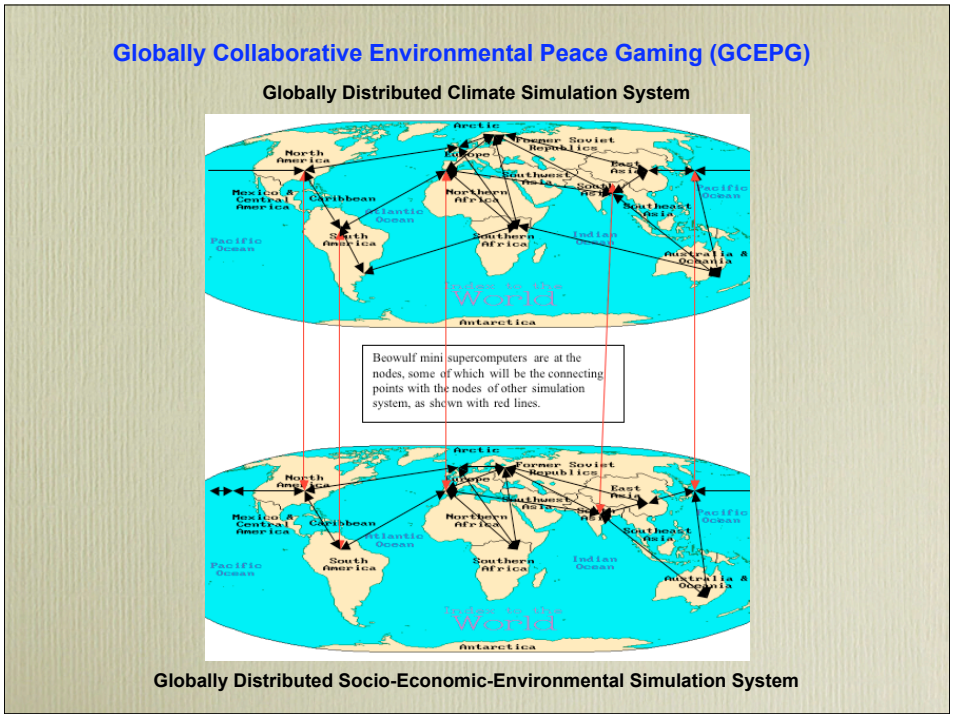
**Community Development Networks (CDNs)** will connect higher, secondary and elementary schools, libraries, hospitals, local government offices and NGOs, etc., firstly in the City of Manaus and later in the cities of main campuses of the CampusNet affiliated universities, with the use of broadband wireless Internet.






**Community Development Networks (CDNs) will connect the universities with secondary and elementary schools, libraries, hospitals, local government offices and NGOs, etc., firstly in the City of Manaus and later in the cities of main campuses of the CampusNet affiliated universities, with the use of broadband wireless Internet at drastically discounted rates or free of charge.**

**Similar projects are now starting in Cuba and the Caribbean region, Malawi and Uganda in Africa.**






**E-mail and multimedia World Wide Web of Internet so far contributed significantly to the world society on the dissemination of information. The next phase of the Internet development with global neural (or GRID) computer networks should be the globally collaborative experiential learning and constructive creation of wisdom with interactive actions on virtual reality simulation models of joint global research and development projects on various subjects.**

**Globally Collaborative Environmental Peace Gaming**
**through**
**Global Neural Computer Network**

- **Need: Kyoto Protocol**
- **Computer Simulation Models**
  - **Socio-Economic-Environment Model**
  - **Climate Simulation Model**
- **Beowulf Mini Supercomputer**
  - **Maui Community College in Hawaii**
- **Global Neural (Grid) Computer Network**

**This will promote trustful friendship among youngsters around the world to realize the Knowledge Society of the 21st century, and their collective creativity will enlarge the size of pie for stakeholders to reach peaceful win-win consequences. Senator Fulbright once said that learning together and working together are the first steps toward world peace.**

## Key Elements of e-Learning

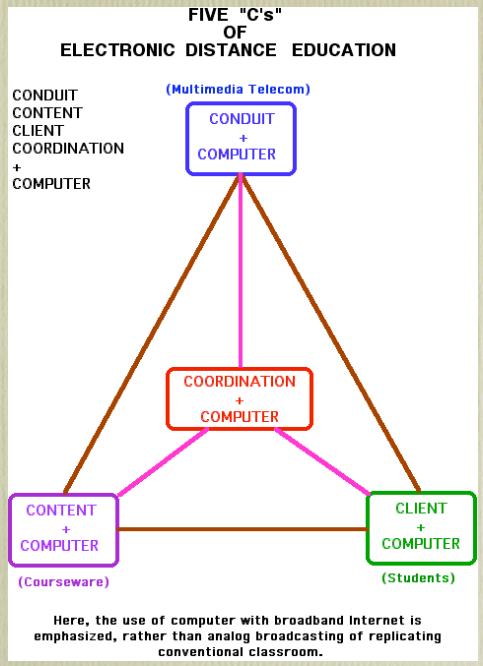
- Computer-mediated communication,
- Active-learning type interactions,
- Instruction taking place at a distance, and
- Synchronous or asynchronous communication

## Characteristics of Virtual Learning Community

- collectively creates knowledge, using computer-mediated communications and global resources;
- enables individuals, regardless of their race, gender, or class, to produce, access and interact with information in ways that are compatible with their needs;
- embraces the characteristics of each culture represented and includes them in the new cultural fabric;
- respects different perspectives and promotes diversity of thought;
- seeks and develops commonalities in experience and purpose (Feyten 1999:4).

## Benefits of Virtual Learning Community

- **Enrichment of social life in a community:** a Social Web can offer the opportunity for people to co-enjoy new forms of culture, entertainment, and leisure.
- **Creating and sharing knowledge in a community:** a Social Web can help to organize the exchange of the wealth of knowledge and experience in local and world-wide communities outside of market mechanisms.
- **Reducing social isolation in a community:** a Social Web can support people in finding others with similar interests, needs, and goals, thereby expanding a person's social radius independent of geographical bounds (Tschang 2001:257).


FIVE "C's"
OF
ELECTRONIC DISTANCE EDUCATION
CONDUIT
CONTENT
CLIENT
COORDINATION
+
COMPUTER
(Multimedia Telecom)
CONDUIT
+
COMPUTER
COORDINATION
+
COMPUTER
CONTENT
+
COMPUTER
(Courseware)
CLIENT
+
COMPUTER
(Students)
Here, the use of computer with broadband Internet is emphasized, rather than analog broadcasting of replicating conventional classroom.

# 7Cs Recommendations

## UNDP's Human development Report

- more connectivity: setting up telecommunications and computer hardware;
- more community: focusing on group access, not just individual ownership;
- more capacity: building human skills for the knowledge society;
- more content: putting local views, news, culture and commerce on the Web;
- more creativity: adapting technology to local needs and opportunities;
- more collaboration: developing Internet governance to accommodate diverse national needs;
- more cash: finding innovative ways to fund the knowledge society.

## Characteristics of Distance Education (DE)

DE encompasses:

- Correspondence courses,
- One-way satellite television,
- Video-taped instruction, or
- Closed-circuit or educational TV courses.

These types of courses lack the key elements of interaction and active learning of e-Learning.

# Financing

- During the Okinawa Summit in July of 2000, Japanese government pledged US$15 billion to close the digital divide in developing countries and for the eradication of poverty and isolation.
- During the G8 Summit in Canada in June of 2002, and at the Environment Summit in South Africa in September of 2002, they also pledged another US$2 billion to aid education and healthcare in developing countries, respectively.

# Financing
(continued)

- GUS projects will combine (1) the Japanese government's Official Development Assistance (ODA) funds and (2) Japanese electronic equipment with
- (a) the Internet technology and (b) content development of North America and Europe,
-
- to help underserved people in rural and remote areas of developing countries by closing the digital divide.




## Conclusion

**The GUS program is a comprehensive and holistic approach to building smart communities in developing countries for e-learning and e-healthcare/telemedicine. Initiatives are underway to create the necessary infrastructure and educational liaisons, and some near-term educational access is expected. Early efforts have included international teleconference technology workshops that have tested the satellite/wireless technology that will be used in GUS.**

**GUS is clearly an ambitious program, one that cannot be achieved by any one group, university, or national government. The program requires substantial collaborative contribution of ideas, expertise, technology resources, and funds from multiple sources. Those who value the vision of GUS are invited to join this great and noble enterprise.**