Asia-Pacific Medical Network Project over super-broadband Internet

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Kyushu University Hospital

21th APAN Meeting : Advanced Network Conference in Tokyo
Today’s menu

- What is our project?
  - Backgrounds and Purpose
- Current activities
  - Korea-Japan
  - Asia-Pacific
- Summary & discussion

Kyushu Univ., Fukuoka
Three key elements for telemedicine

Moving images:
1. High-quality
2. High-speed
3. Multi-channel

Broadband network is essential for medical use!
Korea-Japan Telemedical Network

(Hyeonhae/Genkai Project)

Started in 2002

1. National Cancer Center
2. Hanyang Univ Hosp
3. Seoul National Univ Bundang Hosp
4. Ewha Womans Univ Hosp

Bandwidth 2G → Big Broadband Network

- Backgrounds
- Backgrounds

Korea-Japan Medical Network

Kyushu-Univ.

Digital Video Transfer System

Frame rate 30/sec, Time delay 0.3 sec
DVTS: Digital Video Transport System
(Digital Video over Internet Protocol)

1. High quality video
   • No compression of images

2. Little time delay (0.3 sec)
   • No compression process

3. Less expensive
   • Commercially available standard PC and DV camera

4. System is simple
   • Direct connection between DV and PC (IEEE1394)

- Backgrounds

Developed in Japan
multicast
Why Asia-Pacific?
1. Huge population

2. Medical standards are so different due to diversity of cultures, races, and religions

3. There are specific diseases in Asia, such as chicken flu, SARS, and genetic disease, etc

4. Little time difference and short distance among countries
A lot of medical standard among countries

We should see what people are doing in other countries

By high quality live video transmission

We can share medical skill and knowledge beyond the borders!!
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Kyushu Univ., Fukuoka
[1] The First Live Surgery

Aug 1, 2003

- [Image of surgeons in operation room]
- [Image of medical equipment]

[Image of medical team in meeting]

[Image of medical equipment]

[Image of medical team in meeting]
First broadband international tele-surgery link for Japan
—Gigabit connection promotes Japan-Korea tele-surgery—

Kyushu University (Fukuoka City, President, Chisato Kajiyama) has completed implementation of a system designed to provide remote support for endoscopic surgery using a high-speed Internet link between the cities of Fukuoka in Japan and Seoul in South Korea. The university undertook system development jointly with Olympus Optical Co. Ltd. (Shinjuku, Tokyo; President, Tatsuyoshi Kikukawa), Fujitsu Nishi-Nippon Communication Systems Co. Ltd. (Fukuoka City, Fukuoka Prefecture; President, Shoichi Hasegawa) and DoCoMo (Tokyo; President, Shintaro Miura), with the cooperation of KHC (Korea Health Care Company), which made the link between Fukuoka and Seoul.

This Japan-Korea tele-surgery system can provide medical care to patients in both countries. One focus of the project has been to establish a direct connection with gigabit bandwidth between Kyushu University and South Korea by means of an undersea cable network (the KJCN) that spans the Korea Strait, the stretch of water separating the island of Kyushu and the Korean peninsula. The project aims to promote greater academic and cultural interchange between Japan and Korea via the ultra-high-speed communication links installed along the KJCN cables.

Hanyang U

Kyushu U

2003.11.25
2005.5.25
[3] Endoscopy demonstration

2004.11.15
[4] Live demonstration of pathology

2004.8.27-28 NCC → Kyushu U
2004.9.30 Japan Cancer Association
[5] Robotic surgery seminar

Kyushu U
↓
Ewha U

2004.7.16
Remote Robotic Surgery  2005.3.2

Animal Lab in Kyushu U  Kyushu U hospital

Hanyang U hosp  Ope field
Clinico-pathological Teleconference
between Bundang-Kyushu University

Regular meeting now:

2005. 2.17
2005. 7.14
2005. 12.1
Big meeting!
Joint Conference on Medical Informatics (25 Nov. 2005)  
“Virtual Experience of Electronic Medical Record System”  

More than 260 peoples attended!
延辺大学 医療機関連携システムの構築

1G

155M

Connected

Expected
Snaps from China-Japan event

2004.10.12
Medical Network BoF started at BKK. Endoscopic surgery and hematology were subjects for live demonstration.

2005. 1.26
Pancreas Transplantation Teleconference on 18th March 2005
Live demonstration of Bariatric surgery
List of Medical Contents in the Project

• Endoscopic surgery
  (gall bladder, stomach, small intestine, colon, Bariatric)
• Microsurgery
  (neurosurgery)
• Robotic surgery
• Endoscope
  (Endoscopic Retrograde Cholangiopancreatography)
  (EUS guided biopsy)
• Transplantation (Pancreas, Kidney, Liver)
• Pathology
Challenges

• Network extension to Asia-Pacific area

• Increase medical contents

• IPv6

• Uncompressed HDTV transmission on IP
Today’s menu

- What is our project?
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- Current activities
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  - Asia-Pacific
- Summary & discussion
Three characteristics of our system

- Easy
- Cheap
- Developing
- Expanding

Broadband Internet

- Non-compressed
- Medical use

High-quality

(TV & satellite)

International

- Beyond geographical borders
Asia-Pacific Advanced Network (APAN)
North America Via TransPAC2

TEIN-2 Launch
Jan 2006
Future style of medical network

Doctors join the broadband network at anytime from anywhere.
Advantages of our telemedicine project

- For medical staffs and institutions
  - Learn new and different procedures by real watch
  - Many people at once, and at anytime
  - Reduce accidents and complications
  - Deepen friendship by frequent communication

- For patients
  - Provide better and safer medical care

- For global health care
  - Standardization and globalization

Kyushu Univ., Fukuoka
For Establishment of Telemedical Network in AP

Medical staffs

Engineering team

Government and Companies
We have opened AQUA: Asia-Kyushu Advanced Medical Network.
http://www.med.kyushu-u.ac.jp/aqua
Welcome to "AQUA" homepage

AQUA is a consortium organized in Kyushu, Japan, to establish an advanced medical network in Asia-Pacific region using super broadband Internet. AQUA stands for Asia-Kyushu Advanced Medical Network, and symbolizes our country surround by sea. We will dedicate to facilitate medical exchange beyond geographical borders for ultimate benefits to patients and happiness of people in the world.

what's new?

- 2005/6/11 -- update Finished events
- 2005/7/27 -- update Finished events
- 2005/7/22 -- update Finished events
- 2005/7/6 -- update Finished events
- 2005/7/5 -- update P&P and Staff and secy.

URL :http://www.med.kyushu-u.ac.jp/aqua/
### Finished Events

#### 2003

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<td>nurse and endoscopic surgery</td>
<td>video</td>
<td>Kyushu-Hanyang</td>
<td>Kyushu U., Hanyang U.</td>
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<td>2003.8.1 Live surgery (stomach)</td>
<td>endoscopic surgery</td>
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<tr>
<td>3</td>
<td>2003.8.22 Live surgery (stomach)</td>
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<td>live</td>
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<td>4</td>
<td>2003.10.6 Live surgery (gallbladder)</td>
<td>endoscopic surgery</td>
<td>live</td>
<td>Hanyang-Kyushu</td>
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<td>5</td>
<td>2003.10.21 APAMI Live demonstration</td>
<td>nurse and endoscopic surgery</td>
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<td>Daegu-Kyushu</td>
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<td>2003.11.5 Live surgery (colon)</td>
<td>endoscopic surgery</td>
<td>live</td>
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<td>7</td>
<td>2003.11.25 Live surgery (neurosurgery)</td>
<td>neurosurgery</td>
<td>live</td>
<td>Hanyang-Kyushu</td>
<td>Kyushu U., Hanyang U.</td>
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#### 2004

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<td>ERCP</td>
<td>live</td>
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<td>2004.5.31 Transplantation teleconference</td>
<td>transplantation</td>
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<td>transplantation</td>
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<td>2004.7.7 NORTH Seminar</td>
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<td>2004.7.12 Network lecture</td>
<td>endoscopic surgery</td>
<td>slide, video</td>
<td>Kyushu-Ehwa</td>
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</table>
Here, we explain how to start a teleconference using "DVTS" environment.

### Basic & simple configuration

A teleconference can be started with very simple system configuration. Required items are shown in Table 4-1.

#### Table 4-1 Items required

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<th>Item</th>
<th>Figure</th>
<th>Specifications</th>
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</table>
| Digital Video Camcorder| ![Camcorder](image1.png) | - IEEE1394 (or FireWire?, i.Link) interface  
                        |                           | - Built-in or external microphones |
| Personal Computer      | ![Laptop](image2.png) | - Desktop or notebook type, running Microsoft Windows XP  
                        |                           | - High-speed CPU (ex. Pentium IV, III, M, Celeron over 2GHz)  
                        |                           | - 256-512MB RAM minimum |
|                        |        | - Higher class graphic cards or chips (ex. ATi, nVIDIA recent models)  
                        |                           | - Minimum display resolution of 800x600 |
|                        |        | - Fast Ethernet interface or Gigabit Ethernet interface  
                        |                           | - IEEE1394 (or FireWire?, i.Link) interface |
|                        |        | - Stereo audio output interface  
                        |                           | - RGB or DVI output interface |
| Projector & Screen     | ![Projector](image3.png) | - Minimum display resolution of 800x600  
                        |                           | - Brighter light source  
                        |                           | - RGB or DVI input interface |
| Speaker with amplifier | ![Speaker](image4.png) | - Stereo RCA type pin-jack or mini-jack type inputs |
Major Event Plans ahead

- 2006.1: Multi-station event @ APAN-Tokyo
  - Live demo at Tokyo-Kyushu-NCC-Taipei
  - Uncompressed HD transmission
  - 10 stations connection with DVTS
- 2006.2: Bangkok teleconference on robotic surgery
- 2006.4: Bangkok surgical meeting
- 2006.4: Live urological surgery from Seoul to Fukuoka
- 2006.7: APAN-Singapore connecting to India, Malaysia, Philippine, Indonesia, etc.
- 2006.10: Endosc & Laparosc Surgeons of Asia @ Seoul
Thank you!
And
Enjoy!