

Archived Material

Historical Purposes Only

Archive - Potential NGI Applications

Remote Control Telemedicine:
sponsored by The National Institutes of Health

Categories

Medicine, Remote Operations

Vision

Allow control of medical instrument from a distance.

Why NGI?

When remote control telemedicine requires video feedback, such as with robotic surgery, a speed of 75 Mbits/sec is required.

Description

As the control of instruments at a distance becomes practical, these techniques will be adopted by the medical community. Applications are envisioned in pathology, dialysis and even in robotic surgery.

Rationale

The mission of the National Institutes of Health is to provide for advances in medical care. Many of these advances will be dependent on the presence of a high speed, low latency, secure digital information infrastructure as represented in the NGI program. Medical advances discovered by the NIH have traditionally been transitioned to the private sector for further development.

Requirements

Bandwidth:

This category of application, command and control, usually requires relatively low

bandwidth. This appears to be the case for the control of medical devices as well. The exception is the robotic surgery application which will require not just the transmission of control signals, but also the transmission of real-time motion images at VHS tape quality (about 75 Mbits/second).

Latency:

Latency is the essential factor in these applications as the overshoot of a controlled parameter could result in a life threatening situation. It has been suggested that the latency of the human nervous system is under 15 msec. and therefore the latency of the control system should be under 10 msec.

Security:

These applications may involve the transmission of real patient data which the patient may consider sensitive or control signal which, if tampered with, could cause life threatening situations.. They require a high level of transmission security to be sure that they cannot be viewed or altered during transmission.

Reliability:

The network must be as close to 100% reliable as possible as lack of reliability could result in life threatening situations.

Scalability:

This group of applications tend to be point to point applications and so will initially not require scalability. However, if viewed as a successful telemedicine applications, the bandwidth available on the network should be scalable so that the capacity can be increased in the future in response to potential increases in demand. In the case of robotic surgery, future additional interactive monitoring sites may be added so that such tele-surgery can also serve a useful teaching function which will require a degree of network scalability.

Partners and Potential Partners

Academic and private sector medicine.

URLs

<http://www.nlm.nih.gov/research/telfront.html>