

## **MU-TELESURG SYSTEM: A TELE-COMPUTER-INTEGRATED SURGICAL SYSTEM**

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### **Abstract**

Computer-Integrated Surgical Research is gaining a momentum in the past decades with the aim of extending the surgical accuracy, efficiency and safety. Computer-integrated surgery, included image-guided surgery, surgical navigations and robot-assisted surgery, provides opportunity in tele-surgery. A number of situations which requires tele-surgery are, such as, less number of skillful surgeons in specific cases, operation in remote-area, operation in dangerous area, operation in space or military necessities.

This paper describes an overview and goal of our ongoing research on development of a tele-computer-integrated surgical system, "MU-TeleSurg". The system can be separated into 3 sections; (1) Expert Field, (2) Communication Field, and (3) Surgical Field.

The expert field is located in a central city which can be easily accessed by high skill-trained surgeons to remotely operate the surgery. The expert field consists of a physical mock-up of the patient, 3D display system, image overlay device, mock-up tools with haptic display capabilities, expert tracking system and communication unit. The communication field includes multiple modalities of communications, such as, LANs, Wireless LANs, WiMax, satellite communication system and satellite relay-mobile unit. Surgical field is located in the remote-area with a specific set up for real surgery. One or two medical personnel is expected to work in collaborate with the surgeon(s) at the Expert Field and a surgical robot system installed at the Surgical Site. Moreover, a navigation system with object-oriented display and physical display is set up to assist the medical personnel at the surgical site. Force acquisition system is employed to feedback the force sensing to haptic display device at the Expert Field. The "MU-TeleSurg" system is aimed to develop for a remote-area with military necessities.