FLORIDA HOSPITAL
NICHOLSON CENTER

Robotic & Telesurgery Research

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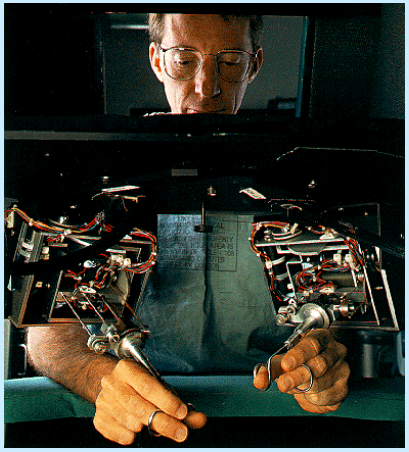
Robotic and Telesurgery Research Summary

Telesurgery



Comms Latency:
- Modify surgical procedures
- Safe Telesurgery at 500ms
- Match to City-Pairs

Automatic Surgery:
- Record Surgery in Simulator
- Execute with Unmanned Robot
- Identify Control Variables

Simulation

Surgical Rehearsal:
- Dynamic Organ Model in Sim
- Patient-specific Rehearsal
- Improve Surgeon Performance

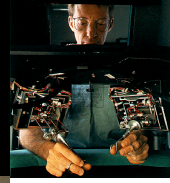
Military-use Validation:
- Simulator of Robotic Surgery
- Retain Skills in Theater
- Define Deployable Package

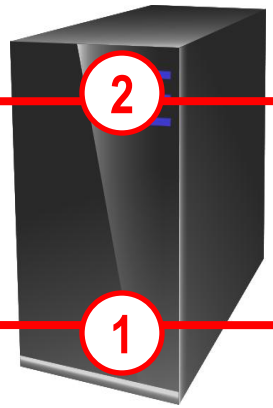
Robotic Curriculum

Consensus Conferences:
- Define Certification Criteria
- Develop Curriculum
- Develop Training Tasks

Curriculum Validation:
- Validate the Program
- Identify Testing Measures
- Set Passing Criteria

Telesurgery: Communication Latency



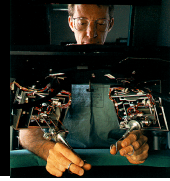


•Stereo HD Video
•Team Audio

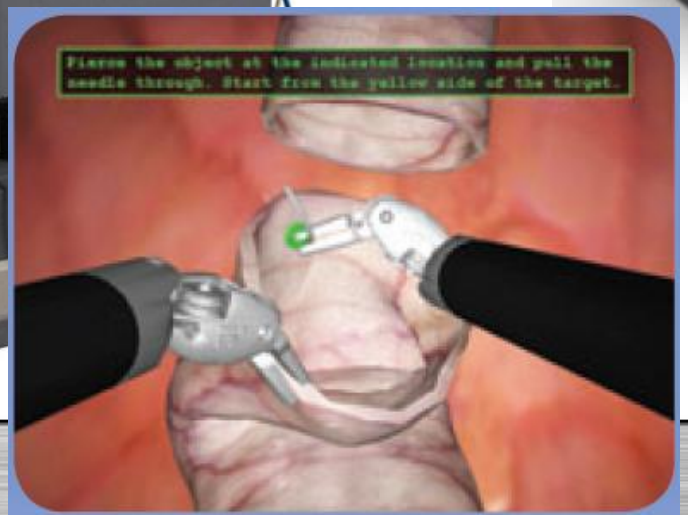
•Robot Commands
•Surgeon Audio

Comm Latency = 1 + 2

Telesurgery: Simulated Latency

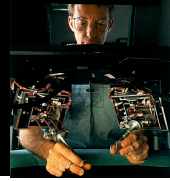


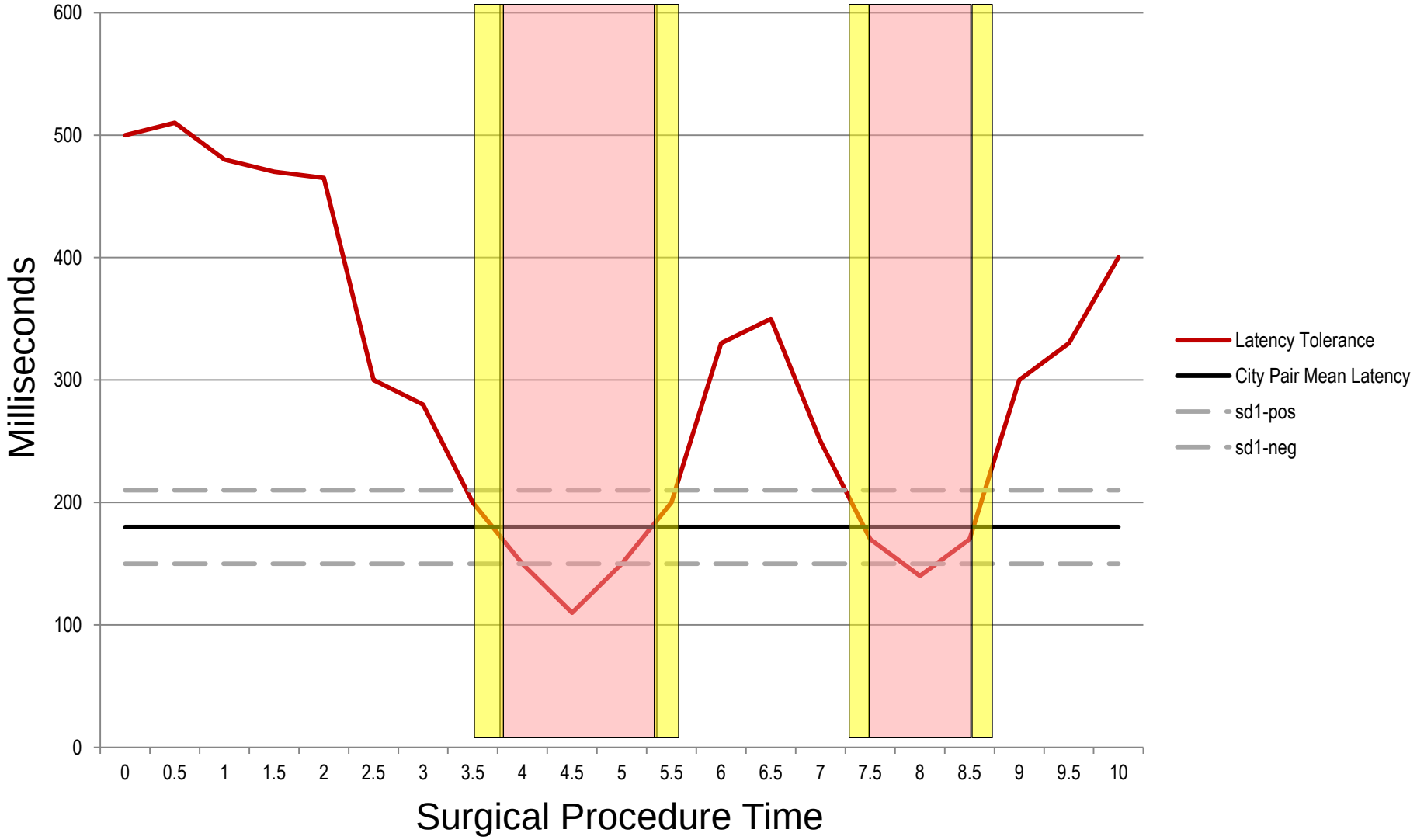
da Vinci Skills Simulator



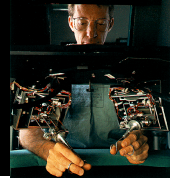
Mimic dV-Trainer

Telesurgery: Latency Tolerance (Concept)





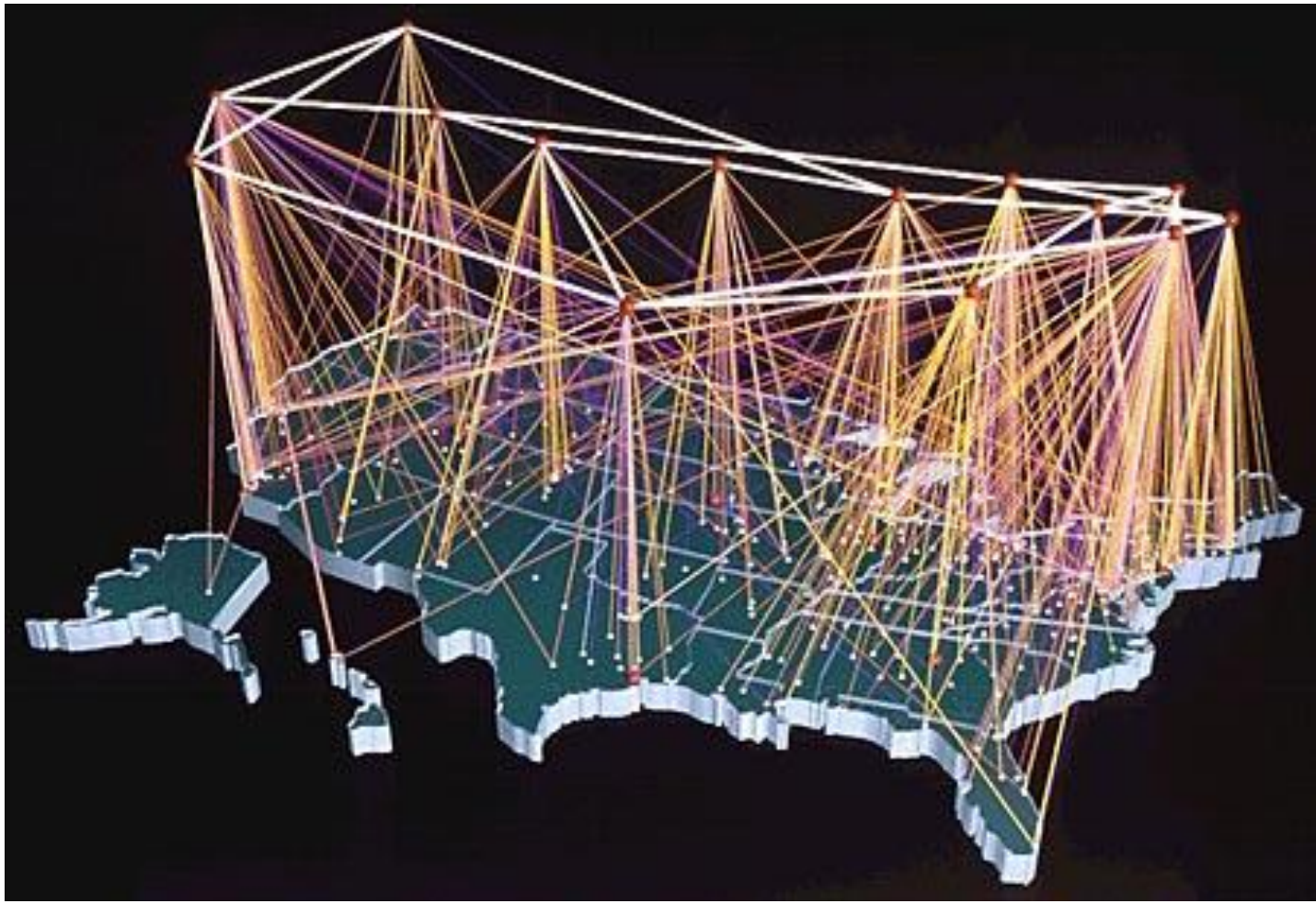
Latency Map: City Pairs

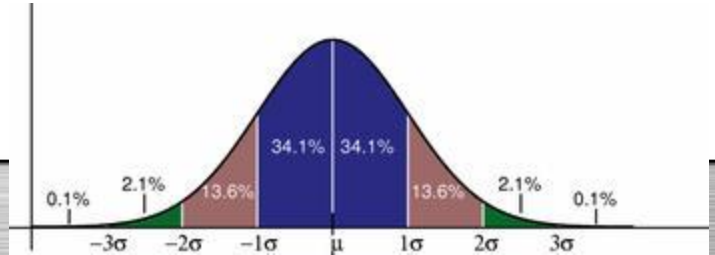


Potential City Pairs:

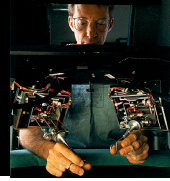
Orlando, FL
Bethesda, MD
Seattle, WA
Boston, MA
New York, NY
Atlanta, GA
Dallas, TX
Denver, CO
San Fran, CA

Strasbourg, FR
Sao Paulo, BZ
Tel Aviv, IS



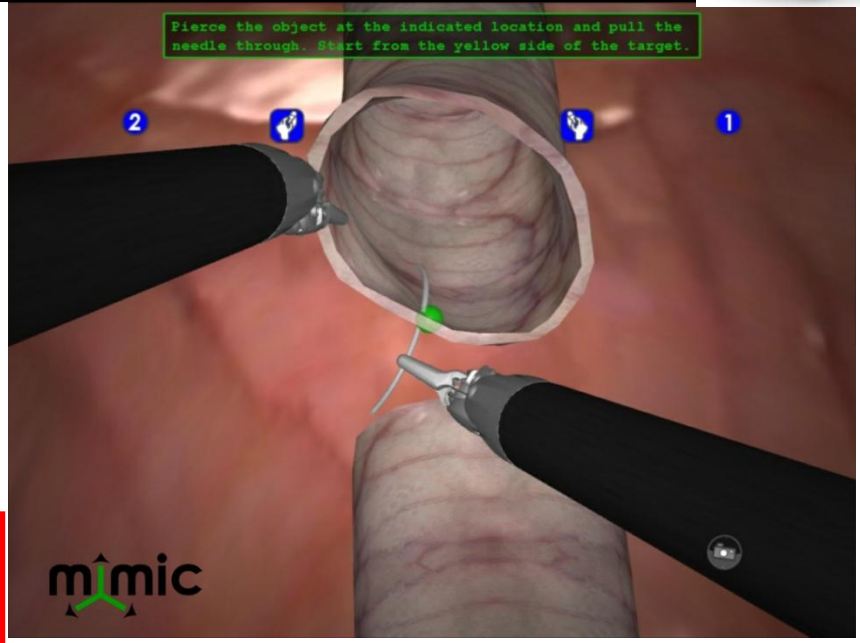


Telesurgery Modifications



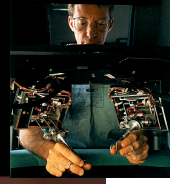
- **Control pace of movement**
- **Subdivide current atomic movements**
- **Change direction of movements**
- **Introduce new instruments**
- **Stabilize tissue**
- **….**

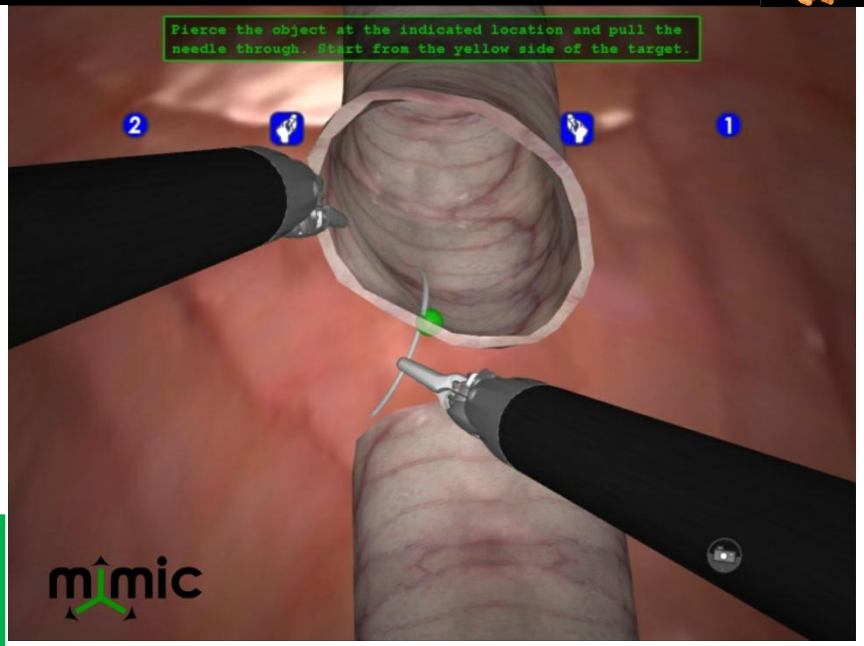
Simulation: Surgical Rehearsal



Skill Trans

Telesurgery: Automatic Surgery





Data Trans

Simulation: Military-use Validation

Robotic Surgery
Skills Retention

Fundamentals of Robotic Surgery

WHAT	Outcomes & Metrics	Course Development	Simulator Development	Validation Studies	Implement: Survey Training Certification	Issue Certification
HOW	Consensus Conference	Standard Curriculum Template	Engineering Physical Simulator	Standard Validation Template	Current Procedures	Issue Mandates And Certificates
WHO	ABS SAGES ACS Specialty Societies	SAGES ACS Societies Academia	Industry with Academia Medical Input	ACS SAGES, Participating Societies	FLS SAGES/ACS	ABS certifier

Future Directions



- **Robotics**
  - Machine assistance for all surgical procedures. “Robot” will take multiple forms to fit the needs of the procedure.
  - Redesigning the operating room to accommodate people, machines, and information.
- **Simulation**
  - Lap and Robotics use equipment to intermediate between the surgeon and the patient. Creates a natural environment for training simulators
  - VR/Games/Browser in providing in-hospital maintenance training. Currently done largely with in-service seminars.
- **Education**
  - Curriculum that integrates lecture, live, and simulation. Nursing has taken the lead in this, surgery catching up.