LTS2000
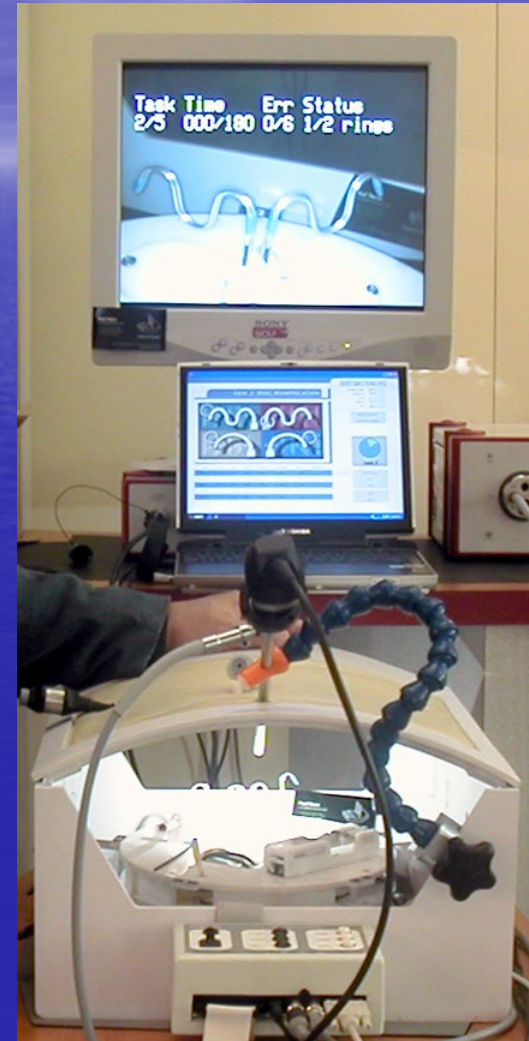
with ISM50 Interactive Sensing Module

Introduction

- The LTS2000 is a physical training simulator for developing and testing laparoscopic surgical skills.

- The ISM50 Interactive Sensing Module adds electronic scoring and feedback to the existing LTS2000 platform.

LTS2000 Physical Simulator

•Enclosure with multilayered abdominal wall

•Adjustable floormat to which various exercise modules are attached

•Camcorder or video laparoscope

LTS2000 with ISM50 Upgrade

- Carousel with physical sensors
- System controller that links carousel to camera, monitor and PC; overlays score data on video monitor
- Benefits:
  - Real-time user feedback
  - Quantification of performance metrics
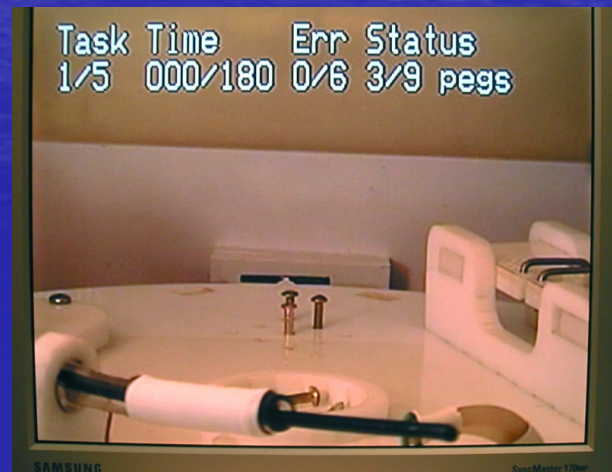 - Facilitates data storage and analysis

Sensor Carousel

- Incorporates 5 laparoscopy training tasks on one platform

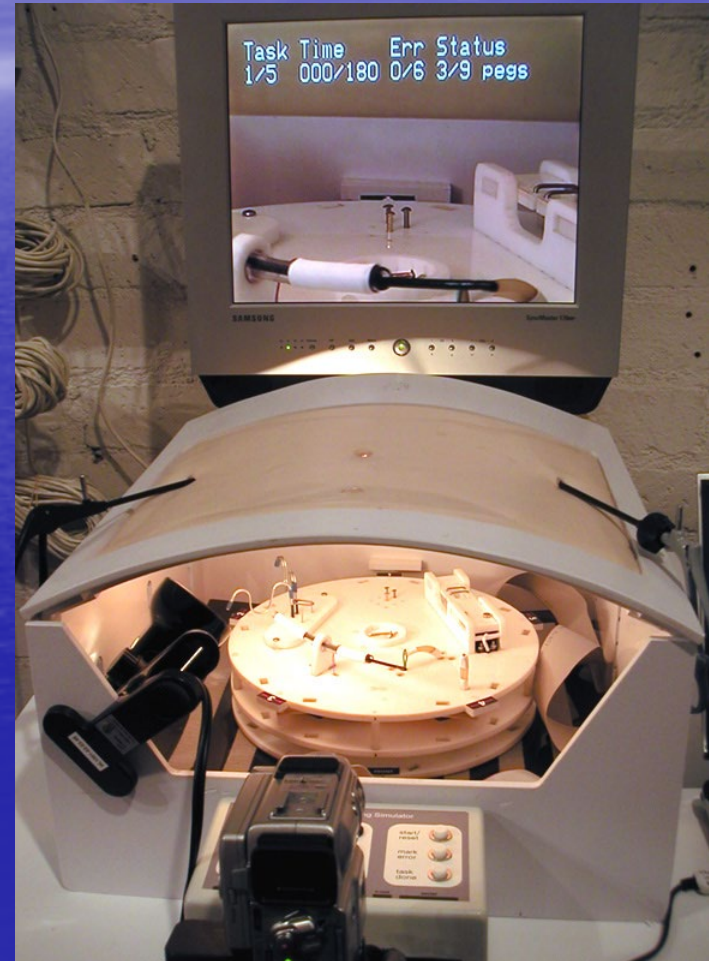- Potentiometer switches tasks as carousel is rotated

System Controller

- Controls task timing and error logging and sends data to PC

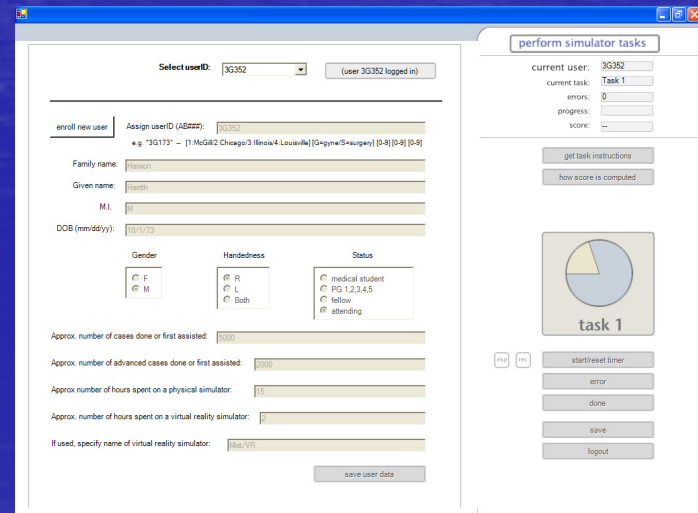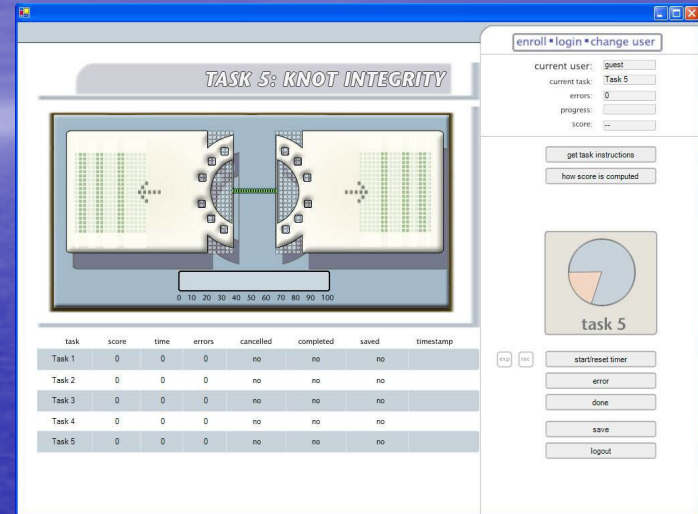- Displays progress and score on video monitor (overlay)

Practice Mode

- "Personal Best" achievement

- Data displayed but not recorded

- PC not required

Testing Mode

- PC software shows real-time feedback

- Data logged to Excel file:
  - User ID / experience level
  - Test data including results
  - Cumulative scores
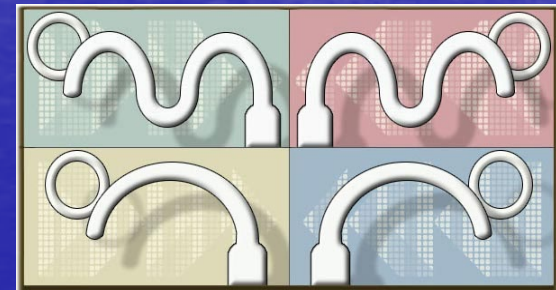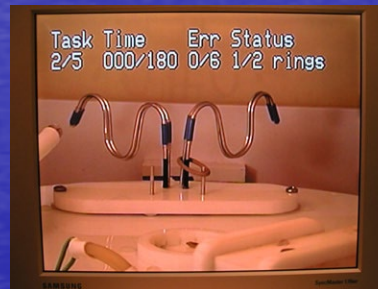 - User login/logout

Coordination Tasks
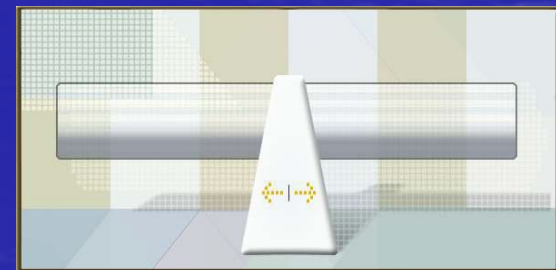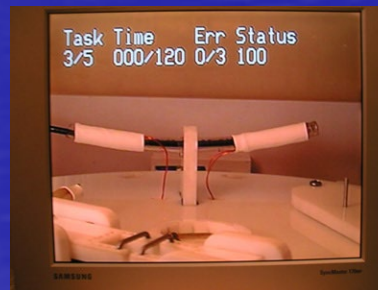
Peg insertion

Insert 6 pegs into 9 holes

Ring manipulation

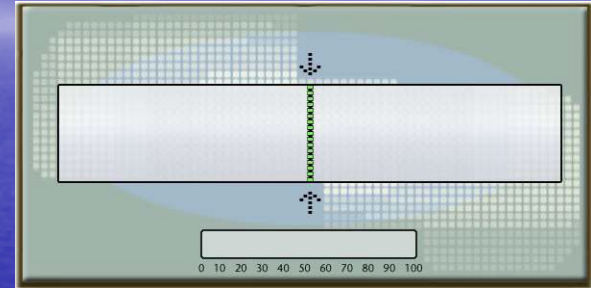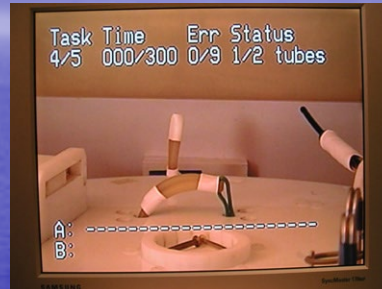Guide 2 o-rings down wire guides, avoiding contact

Cannulation

Thread flexible rod through narrow tube and remove
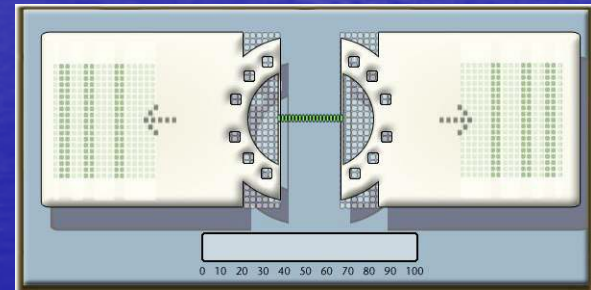
Knot Tying Tasks

Knot tying

Cinch knots around vertical and horizontal tubes

Knot integrity

Tie knot between two plates; test with 2.5 lbs tensile force

Conclusion

- Virtual Reality systems provide excellent visual representation but lack realistic physical sensations due to limited haptic feedback

- LTS2000 with ISM50 is the first simulator to combine:
  - Realistic physical experience
  - Real-time interaction
  - Computerized data storage

- LTS2000 training complements both laboratory and VR simulator training

Further Information

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