



Minimal Invasive Surgery - Future Prospects



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Difficulties in M.I.S.

- 2-D image (loss of depth perception)
- Single direction view
- Limited force-feedback
- Paradoxical movements (fulcrum effect)
- Limited retraction
- fixed angularity
- Limited usage of instruments



Video Demonstration

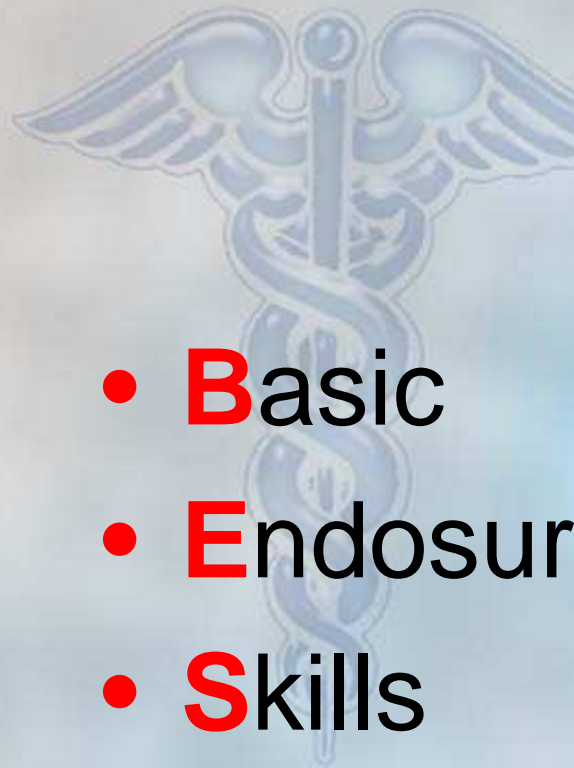




HANDS ON TRAINING



- Holding the Telescope
- One-hand surgery
- Two - hand surgery
- Blunt Dissection
- Sharp Dissection
- Diathermy dissection
- Extra corporal knotting
- Intra corporal knotting
- Suturing



PELVITRAINER



- **B**asic
- **E**ndosurgical
- **S**kills
- **T**raining endotrainer



Cost: Rs. 6000/-



Handling the telescope

6 1 2003

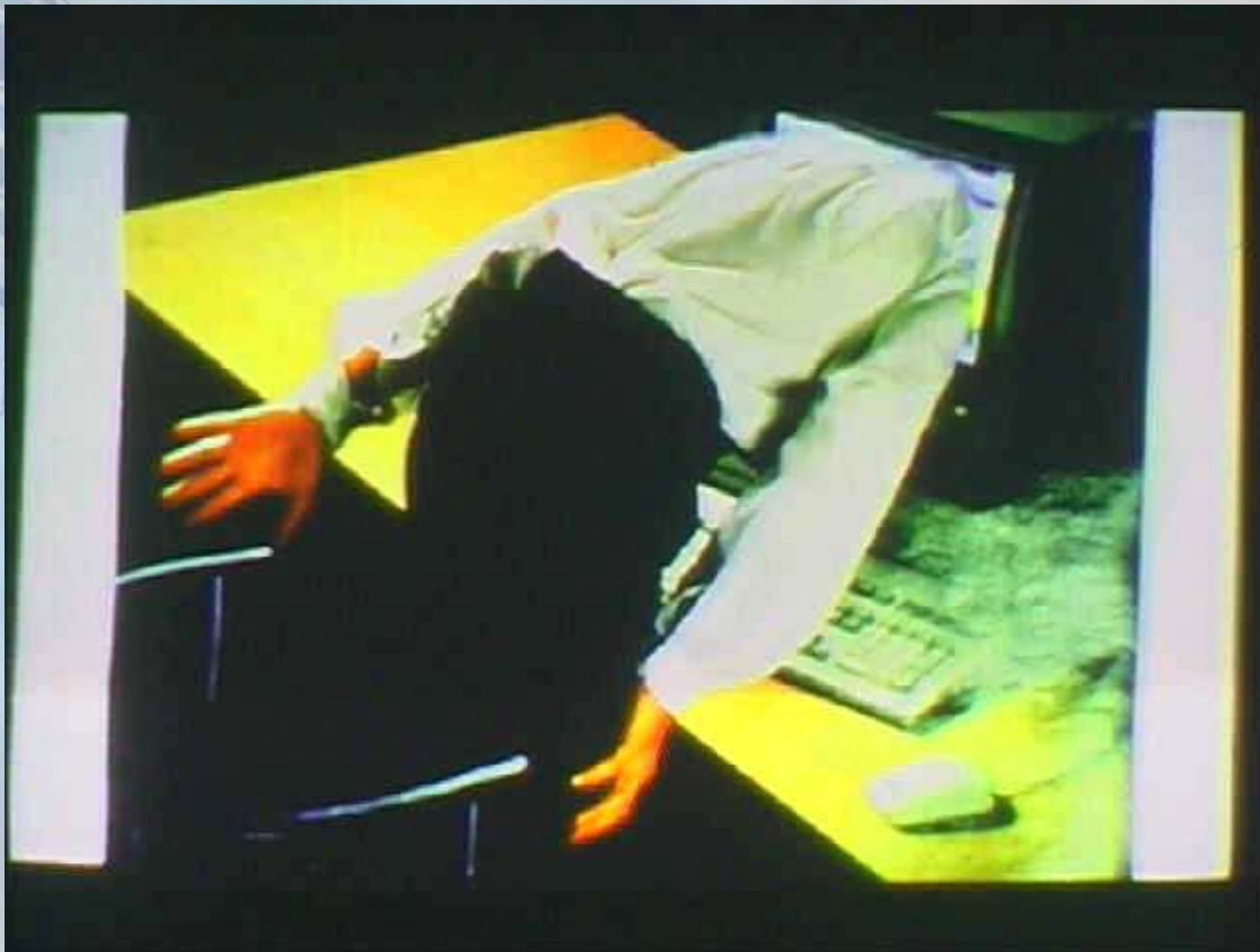


ANIMAL LAB

Continued Practice

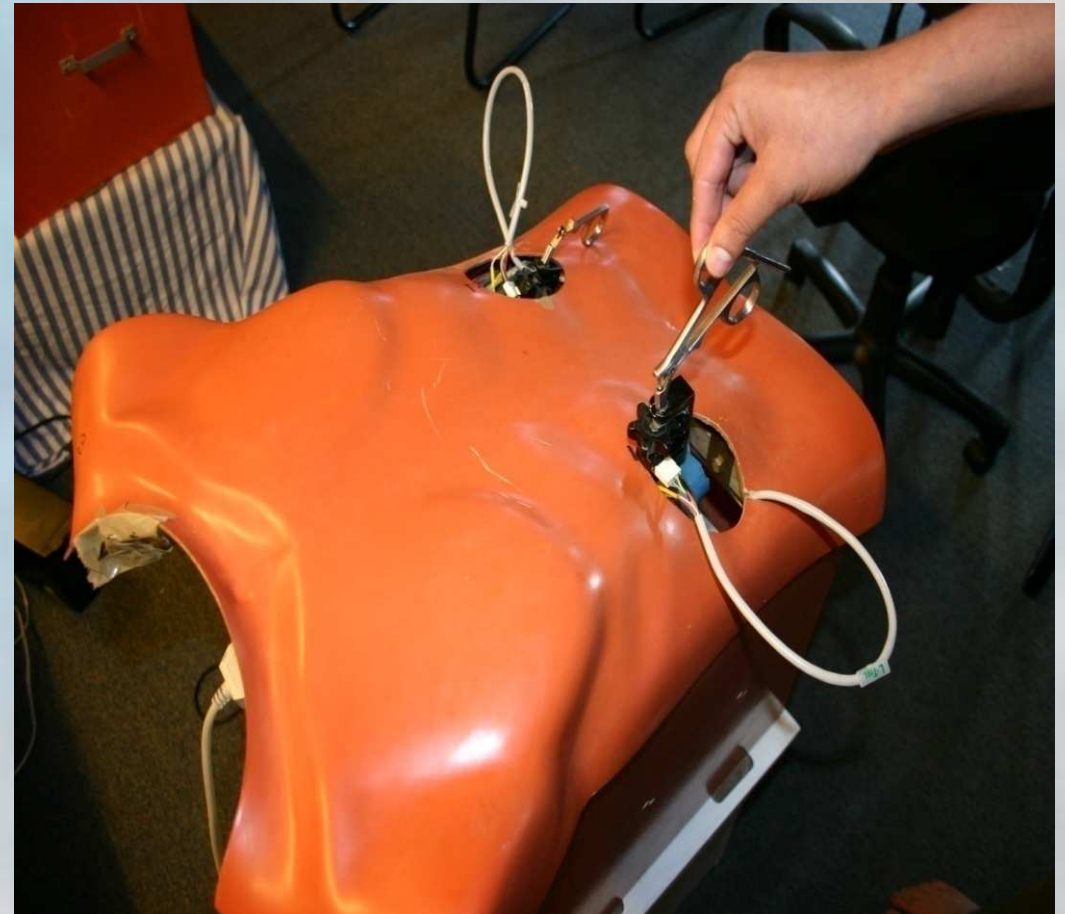
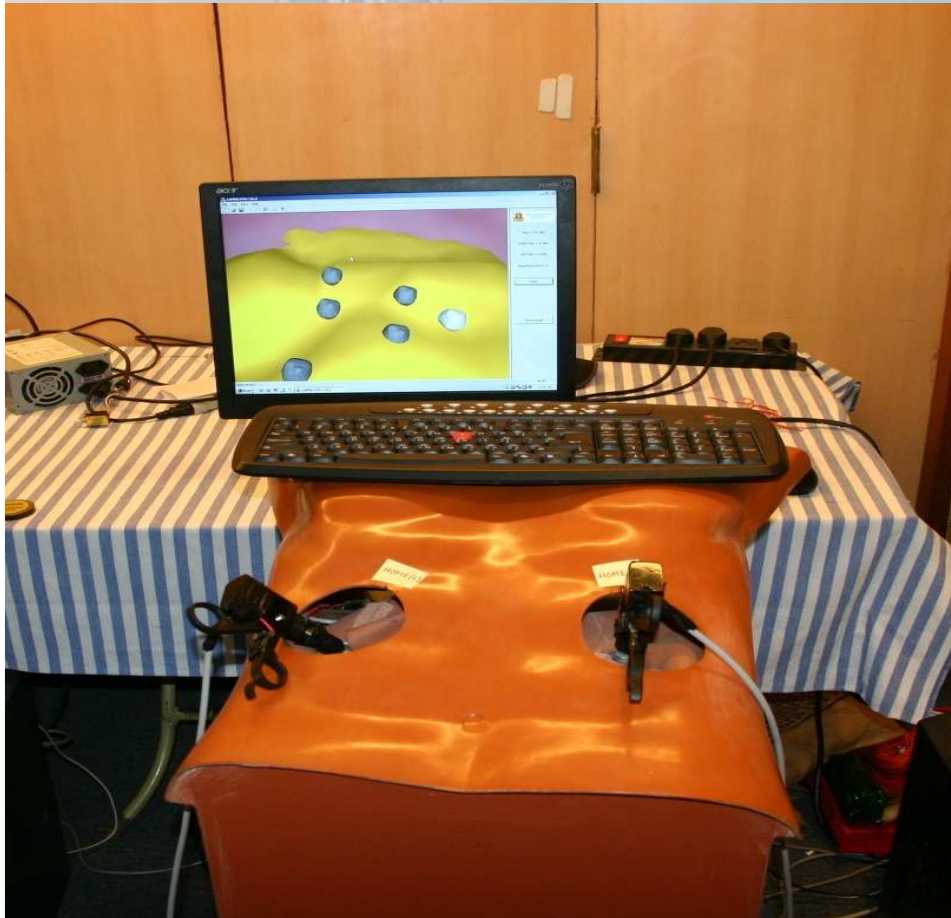


Virtual Reality





The VR Trainer



VR Simulation / Training



- Available to much larger audience
- Provides a more realistic simulation
- More detailed dialogue and interaction



Exercise 1



[Play Ex1 video>>](#)

LAPRO FPS=75.0

File Edit View Help

Time = 33.269

Right Dist = 368.079

Left Dist = 0.000

Negative Score = 0

Login

Show Graph

xrot=-70.047997, yrot=14.088000 -11.637696 9.352242 0.000000

Start LAPRO FPS=75.0 2:41 PM



Exercise 2



[Play Ex2
video>>](#)



Time = 29.235

Right Dist = 1320.908

Left Dist = 239.990

Negative Score = 1

Login

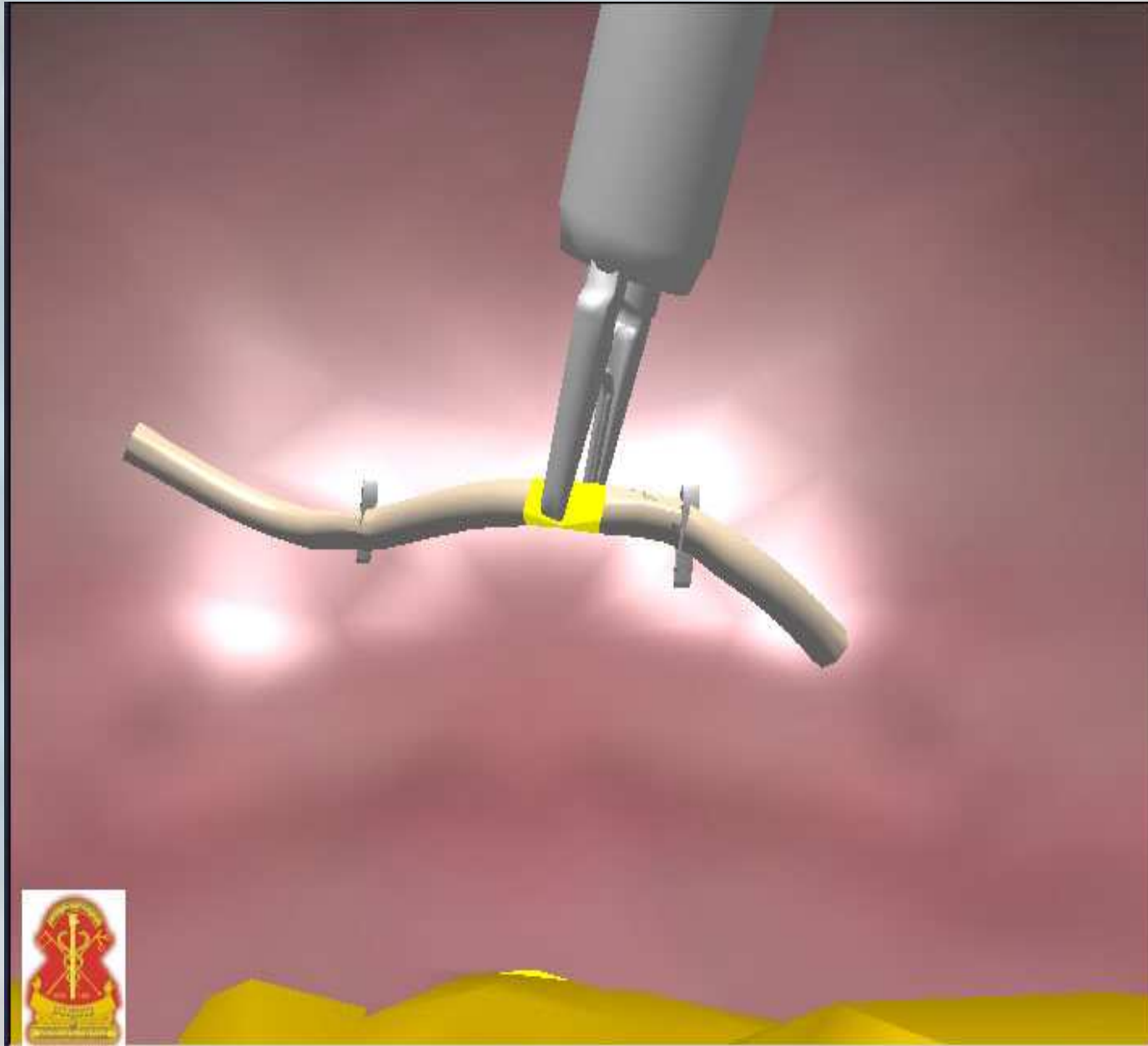
Show Graph



Exercise 3



[Play Ex3 video>>](#)



Time = 44.012

Right Dist = 472.406

Left Dist = 0.000

Negative Score = 2

Login

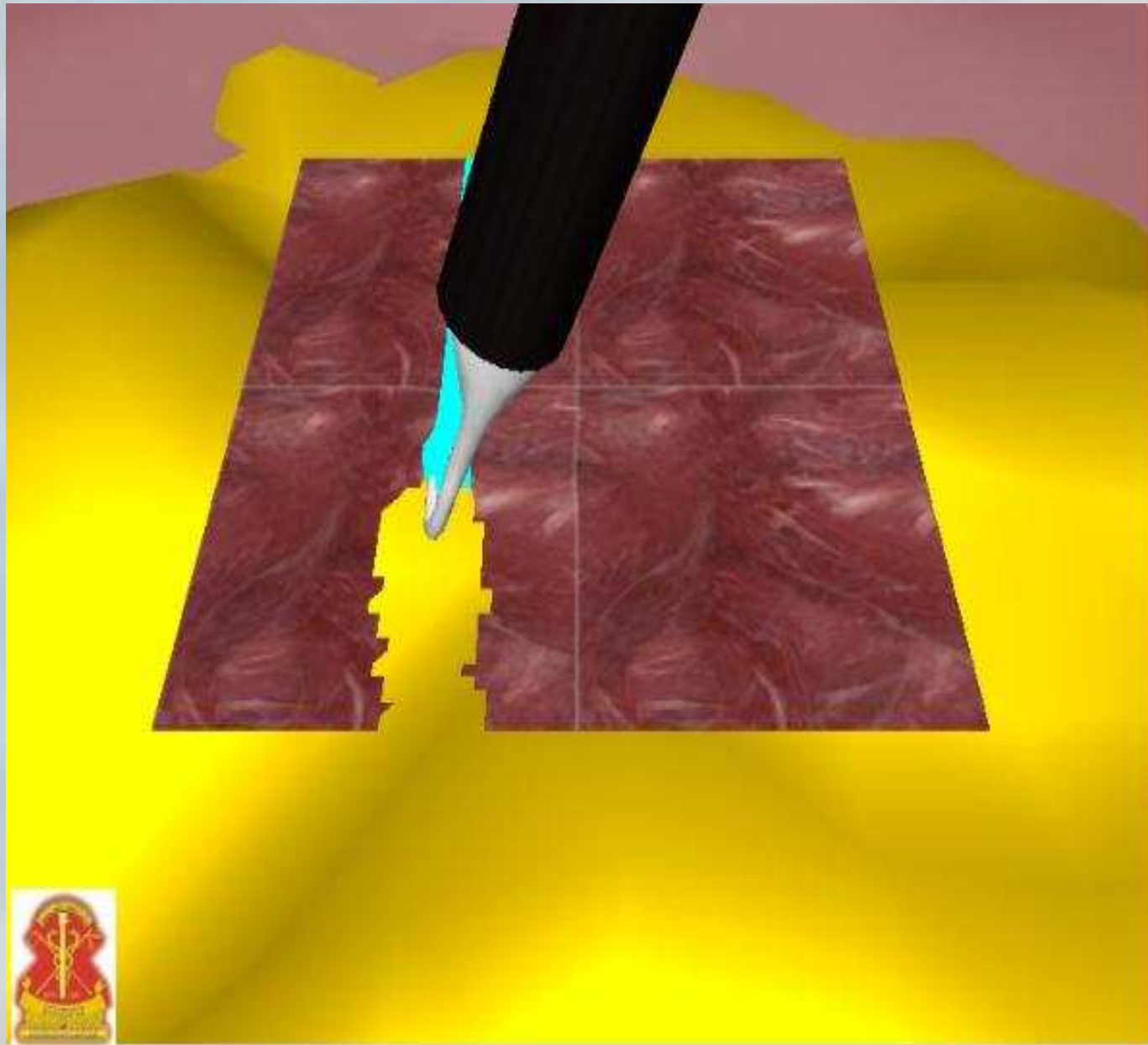
Show Graph



Exercise 4



[Play Ex4 video>>](#)



Time = 39.038

Right Dist = 229.456

Left Dist = 0.000

Negative Score = 2

Login

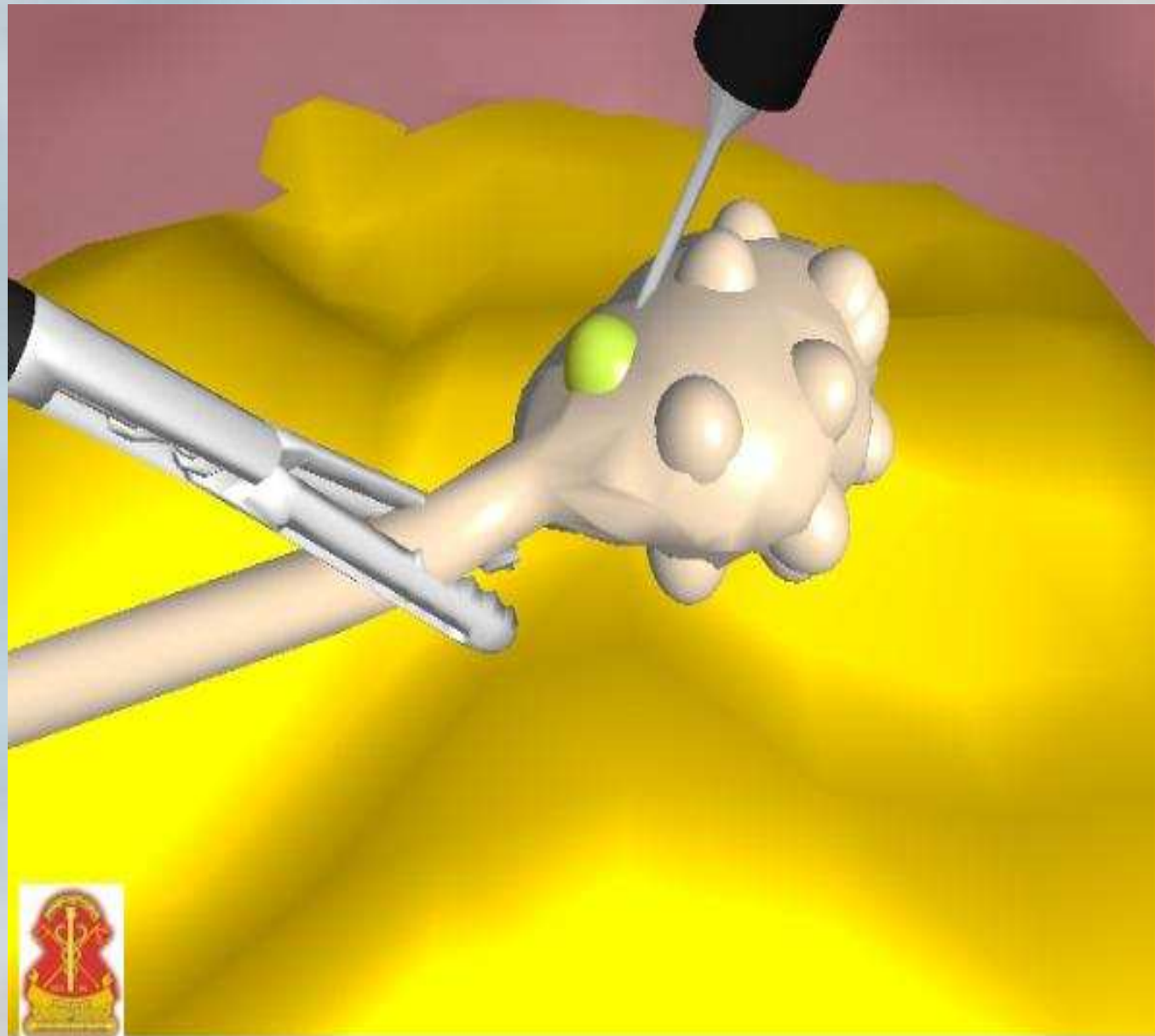
Show Graph



Exercise 5



[Play Ex5
video>>](#)



Time = 35.395

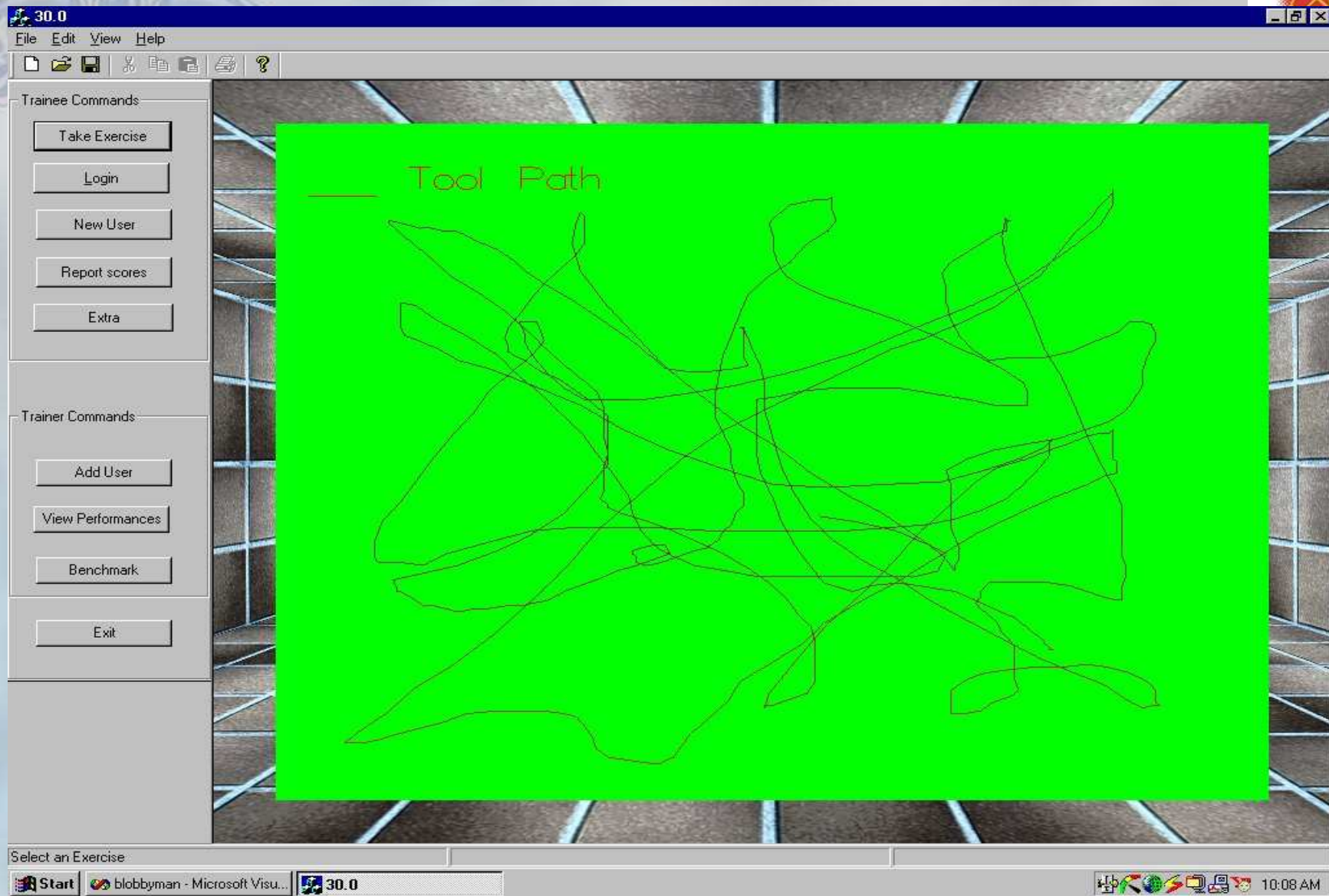
Right Dist = 953.446

Left Dist = 882.865

Negative Score = 2

Login

Show Graph



TOOL PATH

blobbyman



Time: Optimum= 11.336sec Actual= 21.458sec

Distance: Optimum= 153.468cm Actual= 130.287

Negative Score = -5

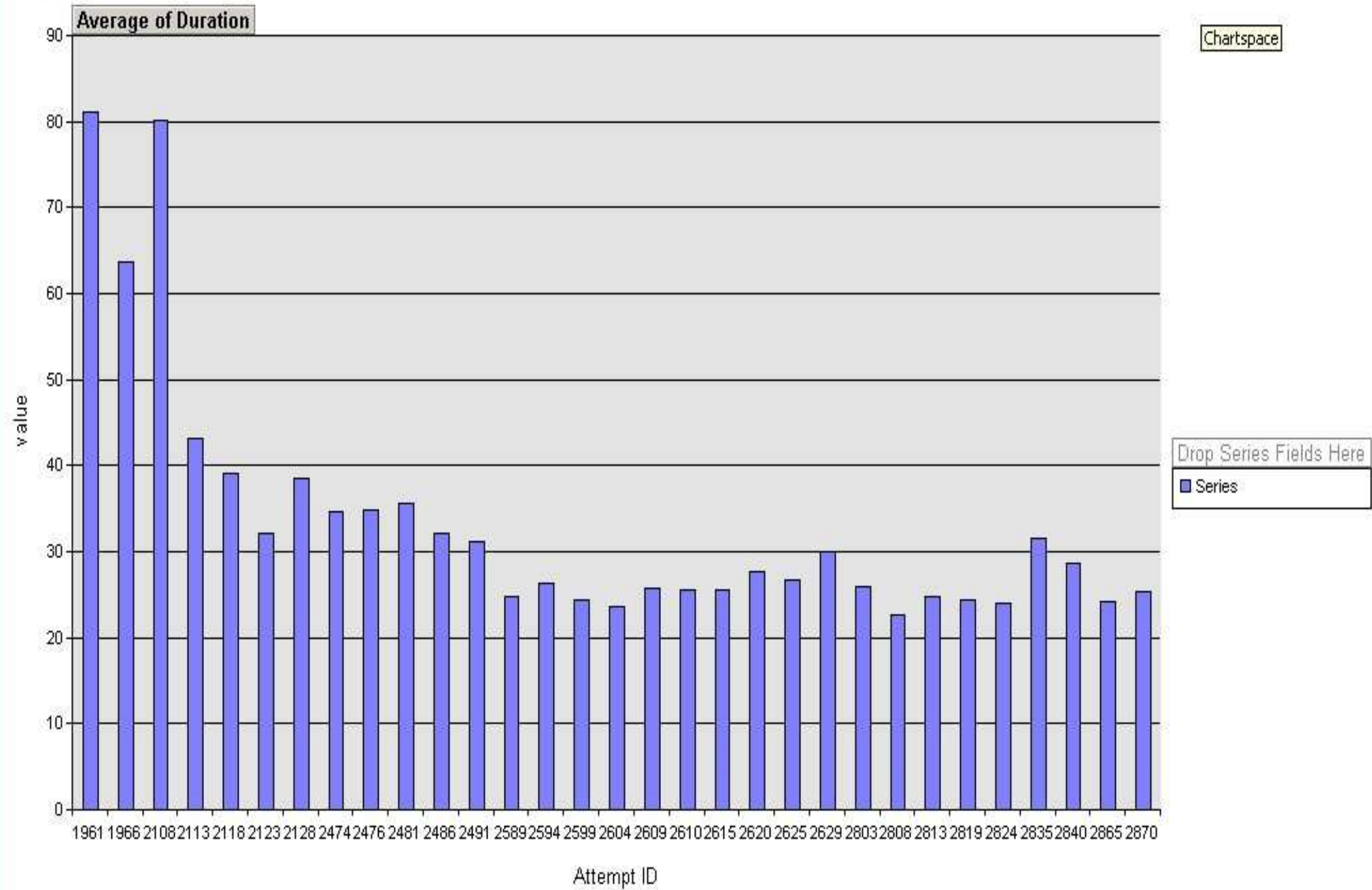
Cummulative Score = 93.841

Avg Speed = 6.072 cm/sec



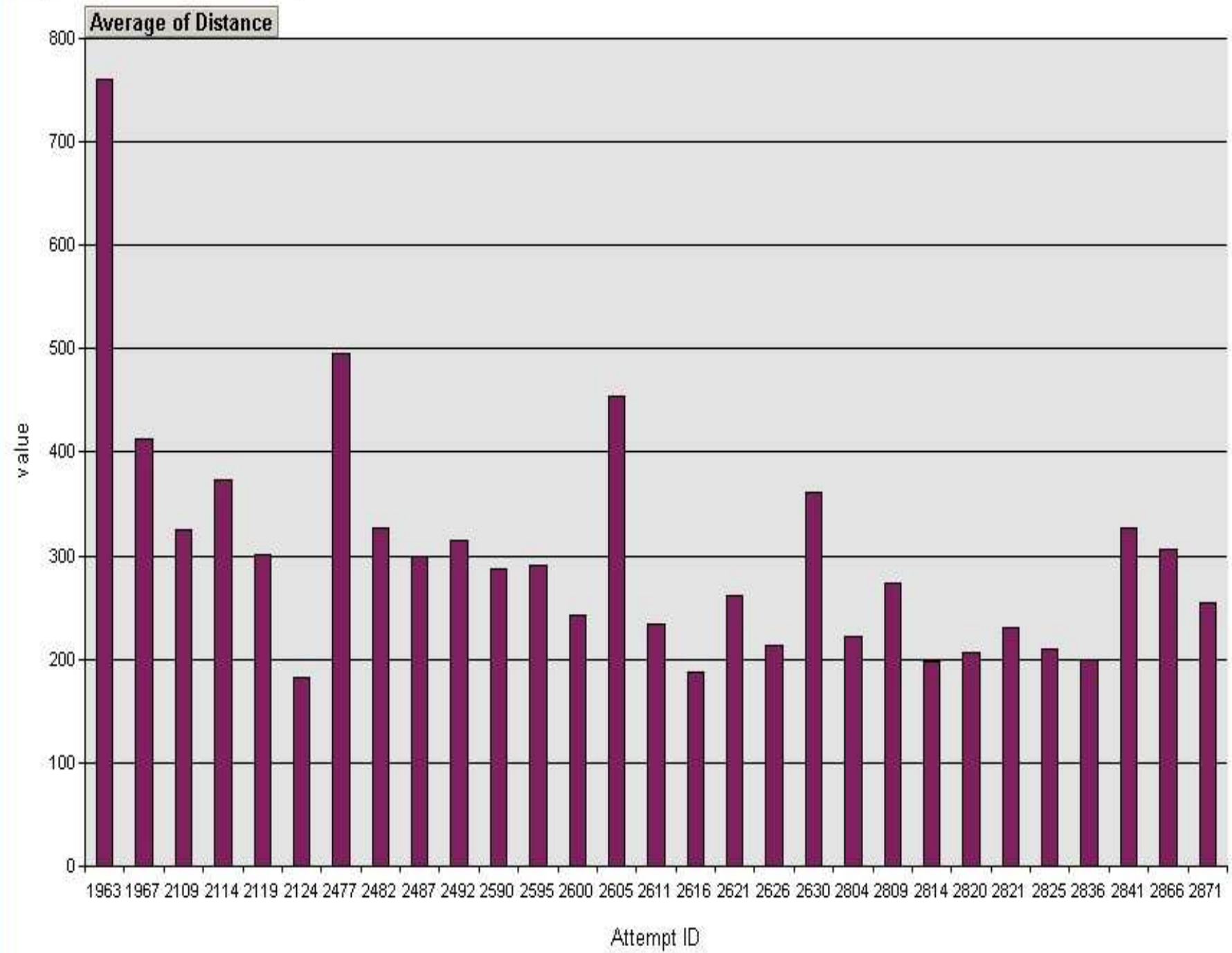
SCORECARD

Name ▾	Exercise ▾	Level ▾
sikaple	1	1



ID ▾

Name ▾	Exercise ▾	Level ▾
sikaple	2	1



Chartspace

Drop Series Fields Here

■ Series

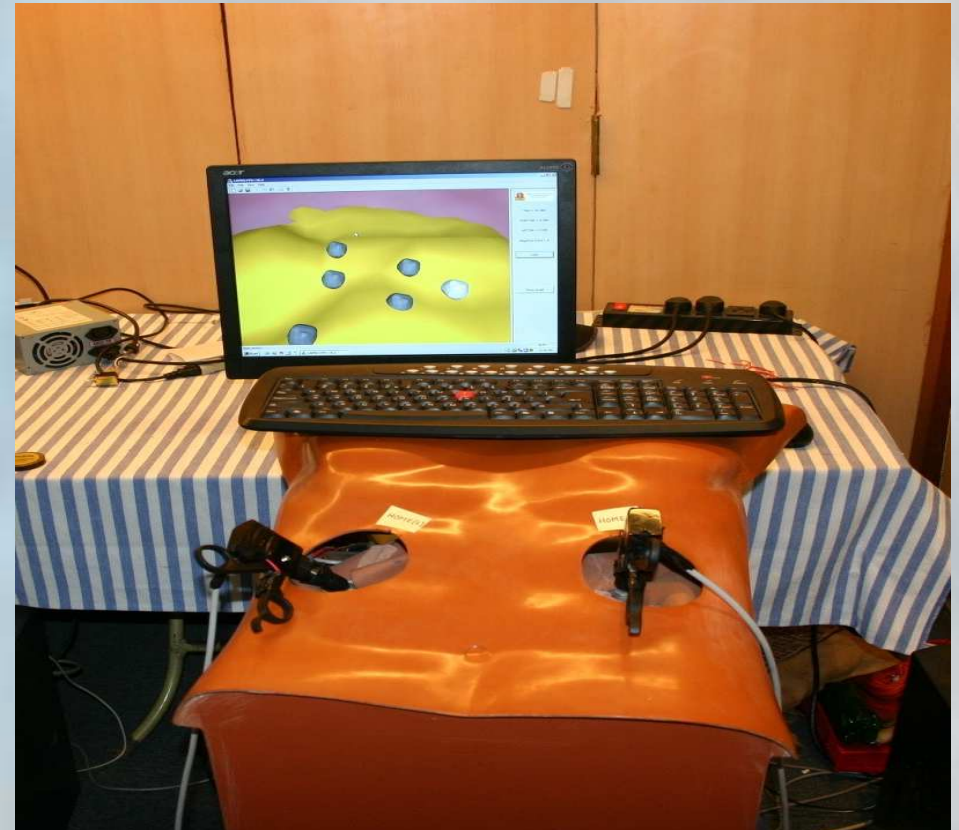
ID ▾

VIRTUAL REALITY TRAINER

Developed by BEST Institute with DRDO



- **D**igital
- **R**ealtime
- **O**bjective
- **N**eolearning &
- **A**ssessment module





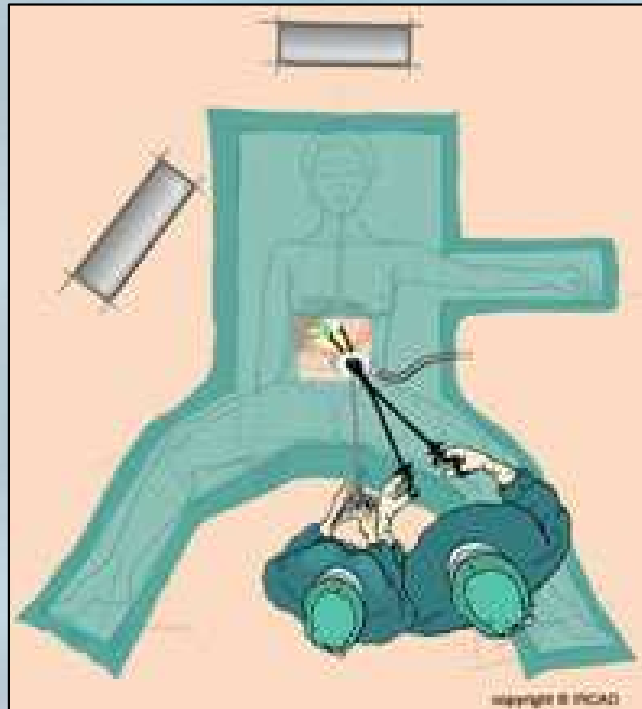
Proctoring

Tele - Mentoring



Advances in MIS

SILS – Single Incision Laparoscopic surgery





Robotic Surgery



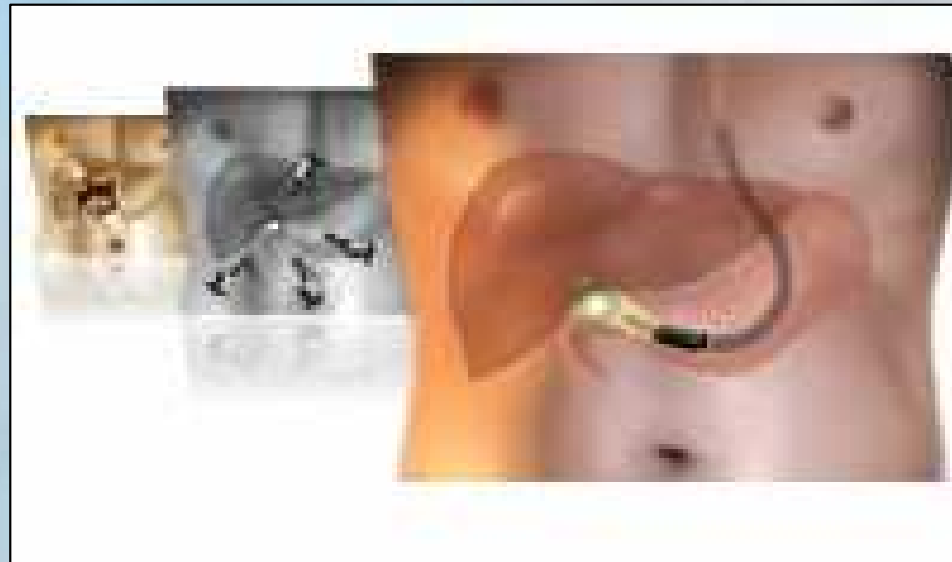
- Aesop
- Zeus
- Hermis
- **DaVinci**
- **Swarm** – Indian Voice controlled camera holding robot



NOTES



Natural Orifice Trans Endoscopic Surgery



Perhaps the future of surgery – 2-10 years

Need of the day

Reduce limitations of MIS



- 2-D image – 3-D vision
- Single direction view – Multi angle vision
- Limited force-feedback – Instruments with force feedback
- Paradoxical movements – redesign instruments

Need of the day (Contd)



- Limited retraction – better retraction instrumentation
- fixed angularity – instruments to become flexible
- Limited usage of instruments - Multi – action instruments

Need of the day (Contd)



- **Digital OR**
 - Digital control of all gadgets
 - Tele-manipulation
 - Intelligent instruments – with sensors

Need of the day (Contd)



- **Robotic**
 - Surgeon
 - Assistant
 - Nurse
 - Technician
- **Image guided Surgery**
- ***Cost-effective***



Thank You

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