

# Portugal eHealth Summit

## CIRURGIA ROBÓTICA

### **Carlos Vaz, M.D.**

Robotic Surgery Unit Director  
Colorectal Cancer Unit Director

Instituto CUF  
de Oncologia



**I.C.O.**

# CIRURGIA ROBÓTICA

**CONCEITO: O QUE É?**

Lisboa, 21 de março de 2018

Instituto CUF  
de Oncologia



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# CIRURGIA ROBÓTICA

Conceito: o que é?



## FIRST WORLD ROBOTIC OPERATION:

- **CHOLECISTECTOMY**
- **1997**
- **DENDERMONDE – BELGIUM**
- **PROF. DR. JACQUES HIMPENS**



# CIRURGIA ROBÓTICA

Conceito: o que é?



O QUE É...

A “cirurgia robótica” atual pode descrever-se como:

**Cirurgia minimamente invasiva vídeo-endoscópica com recurso a um sistema/interface digital não automatizado – *master-slave* – interposto entre o doente e o cirurgião.**

A cirurgia robótica atual **é uma forma avançada de cirurgia minimamente invasiva vídeo-endoscópica.**

A interposição de um interface digital entre o doente e o cirurgião abre **um mundo de novas possibilidades.**

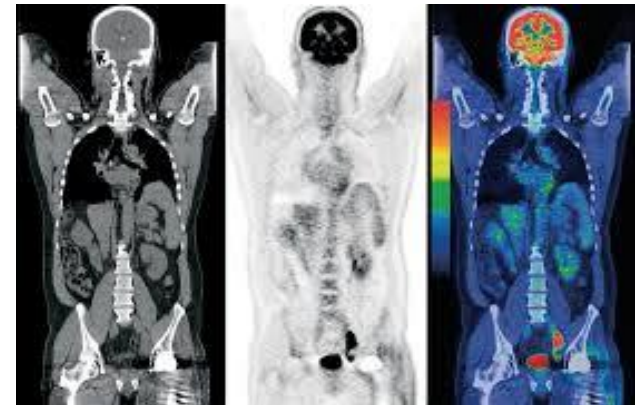
# CIRURGIA ROBÓTICA

Conceito: o que é?



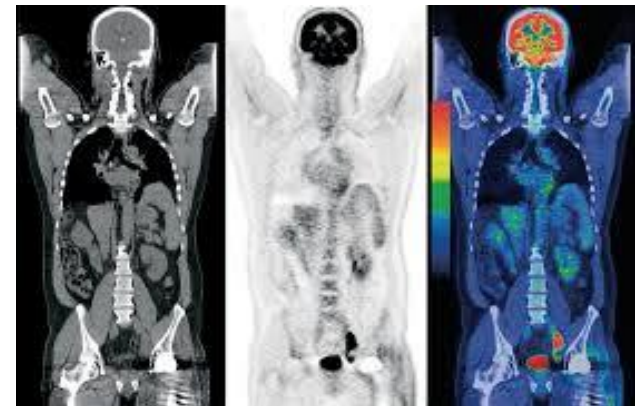
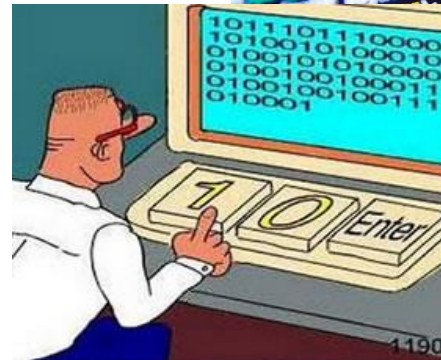
**Robotic surgery concept: DIGITAL SURGERY**

Lisboa, 21 de março de 2018



# CIRURGIA ROBÓTICA

Conceito: o que é?



**Robotic surgery concept: DIGITAL SURGERY**

# CIRURGIA ROBÓTICA

Conceito: o que é?

## ROBOTIC SURGERY - ANALOGIES



# CIRURGIA ROBÓTICA

Conceito: o que é?



## ROBOTIC SURGERY - ANALOGIES





# CIRURGIA ROBÓTICA

Conceito: o que é?



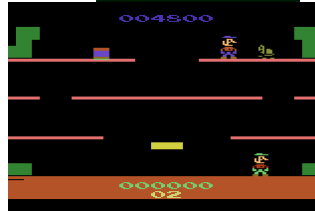
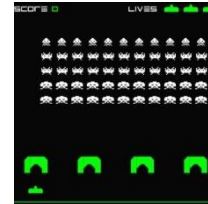
**PONG – 1972**

**(ATARI)**



# CIRURGIA ROBÓTICA

Conceito: o que é?



1970s



2016- Euro 2016



2014- Fifa World Cup 2014

# CIRURGIA ROBÓTICA

**O PRESENTE**

Lisboa, 21 de março de 2018

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# CIRURGIA ROBÓTICA

O presente



*da Vinci*



Lisboa, 21 de março de 2018

# SISTEMAS CIRÚRGICOS DA VINCI INSTALADOS NO MUNDO – Q4 2016



- BRAZIL 29
- Mexico 10
- Argentina 6
- Chile 7
- Other 18



South Africa 4



- Direct
- FRANCE 88
  - GERMANY 76
  - UK 52
  - BELGIUM 33
  - Switzerland 28
  - Sweden 25
  - Netherlands 20

- Dennark 17
- Norway 11
- Czech Republic 7
- Austria 6
- Finland 5
- Ireland 3
- Other 3

- Distribution
- ITALY 70
  - SPAIN 29
  - Turkey 22
  - Russia 20

- Greece 10
- Romania 5
- Bulgaria 2
- Portugal 1
- Poland 1
- Slovenia 1



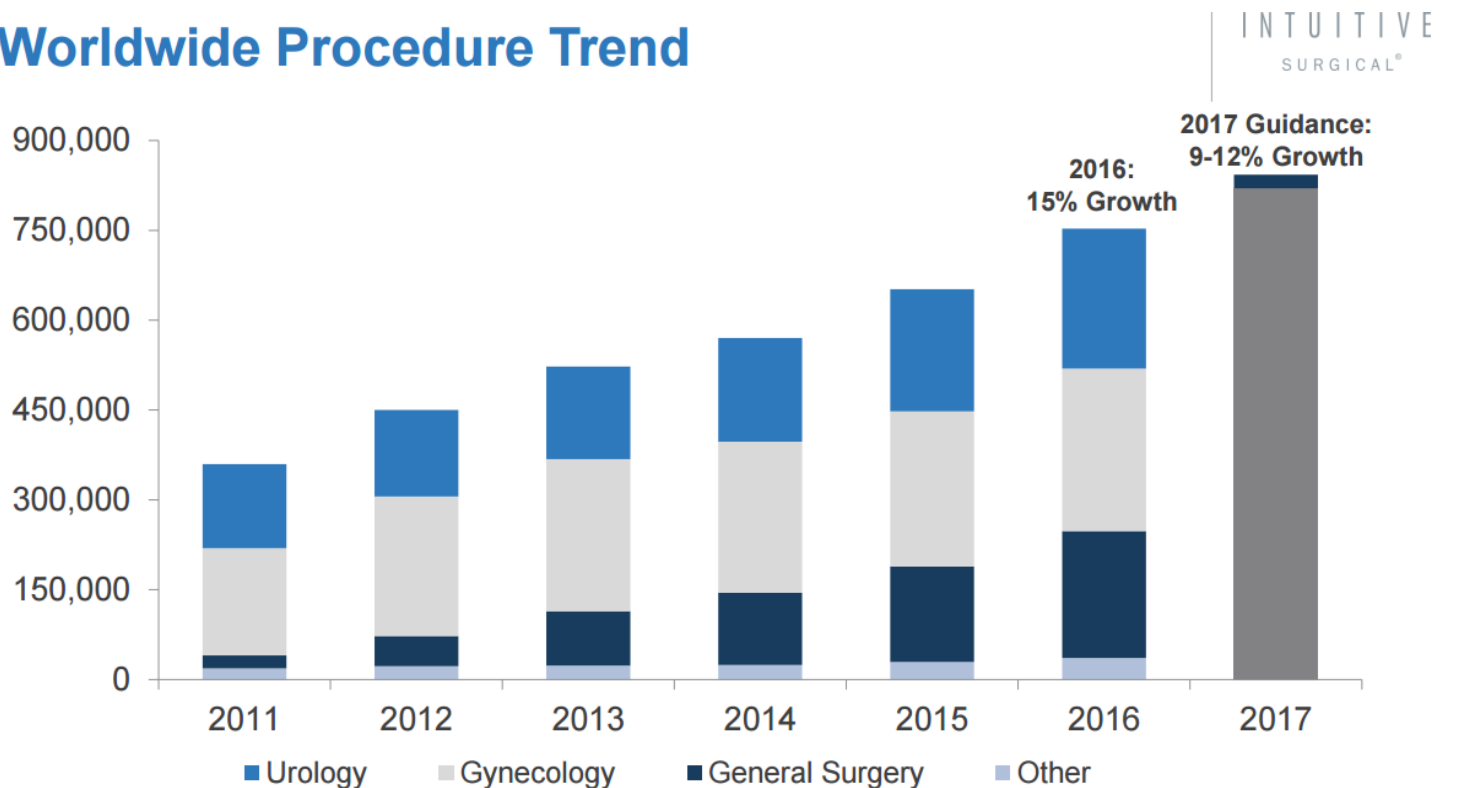
- JAPAN 206
- SOUTH KOREA 52
- CHINA 46
- INDIA 31
- Taiwan 26
- Singapore 7
- Thailand 6
- Other 9



# SISTEMAS CIRÚRGICOS DA VINCI INSTALADOS NO MUNDO – Q1 2017



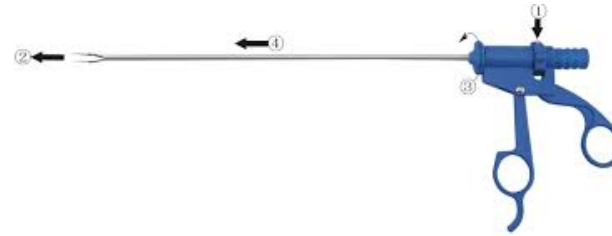
## Worldwide Procedure Trend





# CIRURGIA ROBÓTICA

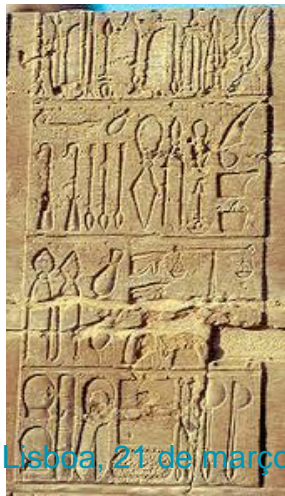
## O presente



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# CIRURGIA ROBÓTICA

## O presente





EndoWrist® Instruments fit through dime-sized incisions

A wide range of instruments are available



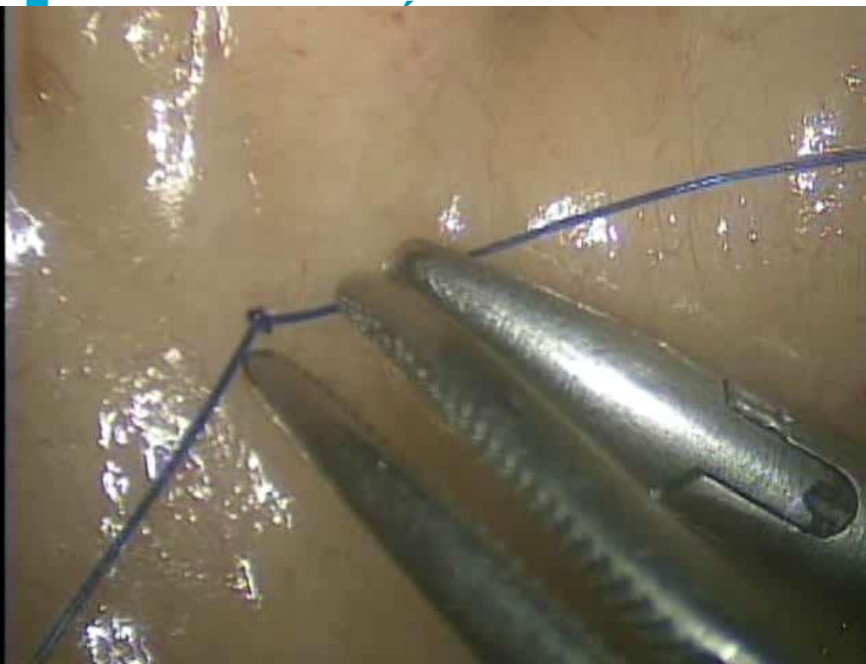
# CIRURGIA ROBÓTICA

O presente



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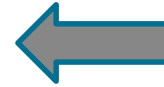
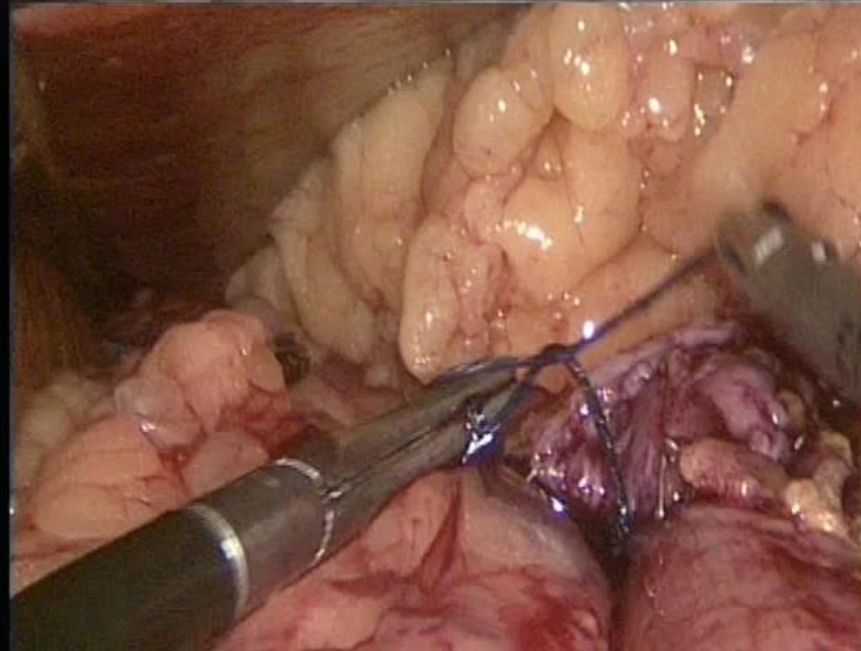


### **ROBOTICS:**

STEADY PICTURE  
MINIMAL STRENGTH  
ENHANCED VIEW  
EXCELLENCE  
ACCURACY  
ENHANCED DEXTERITY

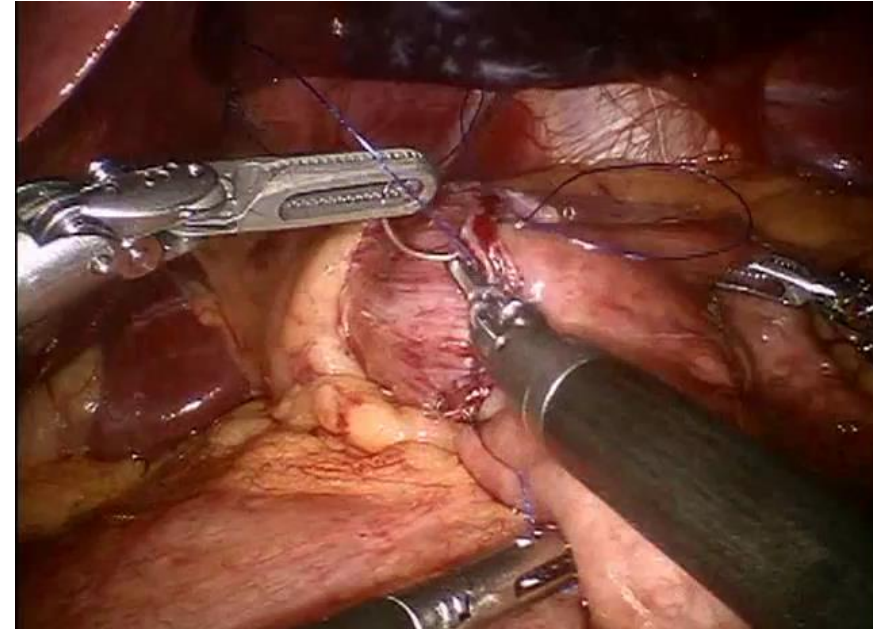
### **LAPAROSCOPY:**

UNSTEADY PICTURE  
GREAT STRENGTH  
RESTRAINED VIEW  
ROUGHNESS  
INACCURACY  
LESS DEXTERITY



### LAPAROSCOPY:

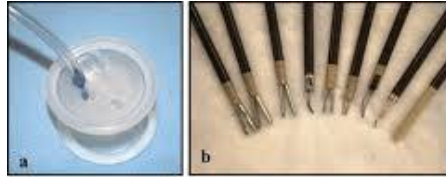
UNSTEADY PICTURE  
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INACCURACY  
LESS DEXTERITY



### ROBOTICS:

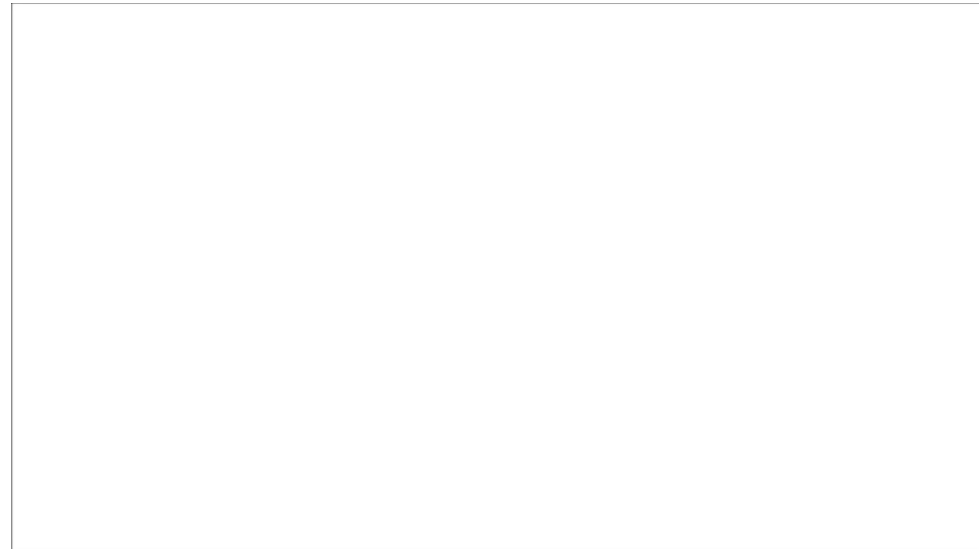
STEADY PICTURE  
MINIMAL STRENGTH  
ENHANCED VIEW  
EXCELLENCE  
ACCURACY  
ENHANCED DEXTERITY





SINGLE INCISION  
DAVINCI 2011

## ROBOTIC SURGERY: SINGLE INCISION



SINGLE INCISION  
DAVINCI 2015

# CIRURGIA ROBÓTICA

O presente



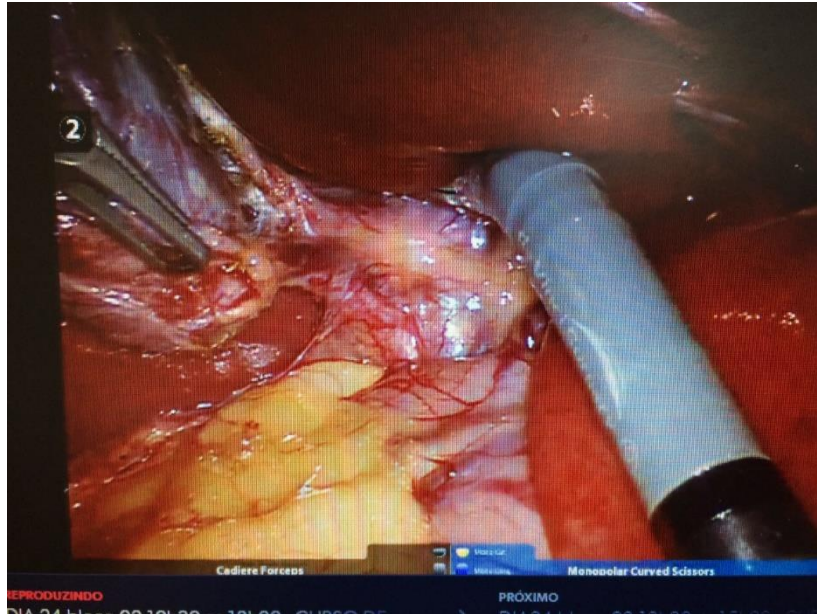
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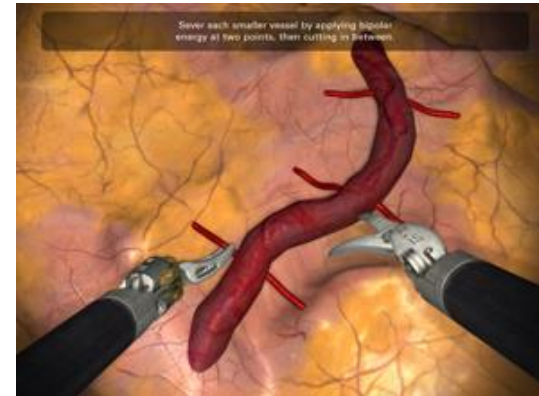
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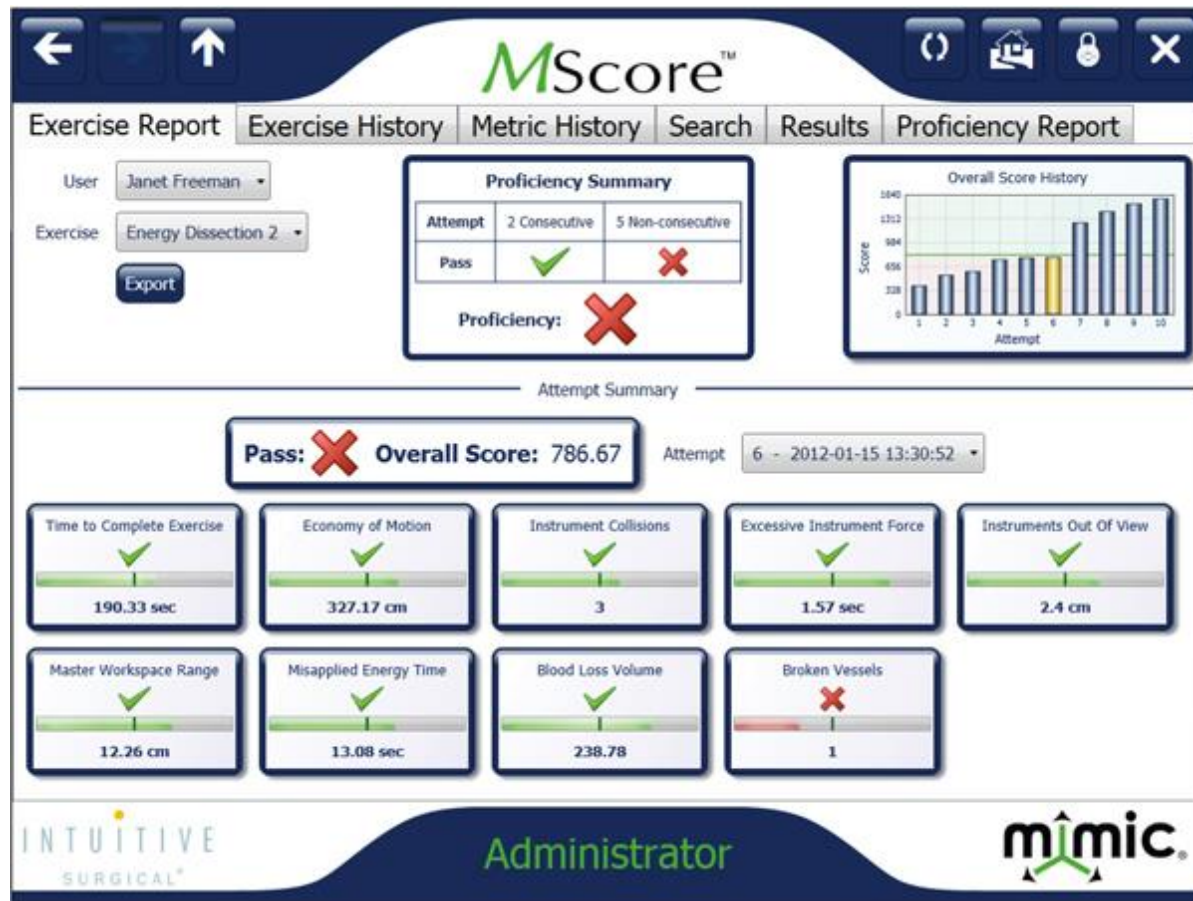
O presente



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# TRAINING / SIMULATION





**MScore™**

Exercise Report | Exercise History | Metric History | Search | Results | Proficiency Report

User: Janet Freeman  
Exercise: Energy Dissection 2  
Export

Proficiency Summary		
Attempt	2 Consecutive	5 Non-consecutive
Pass	✓	✗
Proficiency: ✗		


Overall Score History

Attempt	Score
1	~250
2	~350
3	~400
4	~450
5	~450
6	~450
7	~1100
8	~1250
9	~1350
10	~1400

Attempt Summary

Pass: ✗ Overall Score: 786.67 Attempt: 6 - 2012-01-15 13:30:52

Metric	Value	Status
Time to Complete Exercise	190.33 sec	✓
Economy of Motion	327.17 cm	✓
Instrument Collisions	3	✓
Excessive Instrument Force	1.57 sec	✓
Instruments Out Of View	2.4 cm	✓
Master Workspace Range	12.26 cm	✓
Misapplied Energy Time	13.08 sec	✓
Blood Loss Volume	238.78	✓
Broken Vessels	1	✗

INTUITIVE SURGICAL® Administrator 



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# CIRURGIA ROBÓTICA

**O FUTURO**

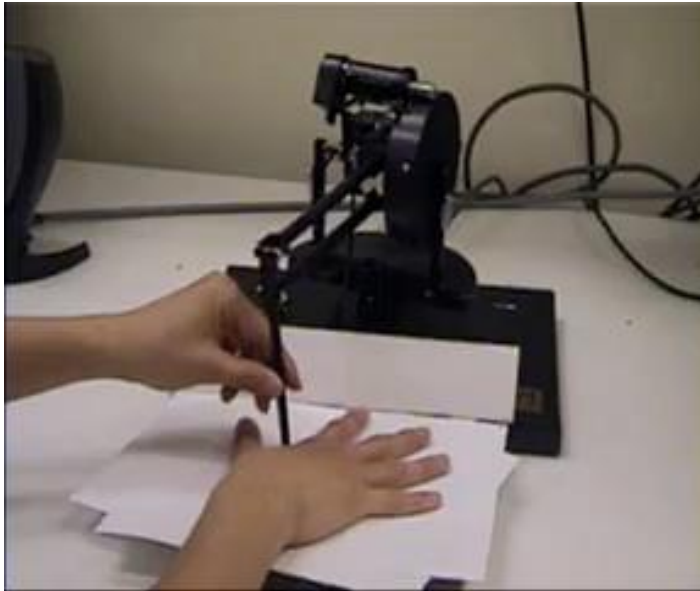
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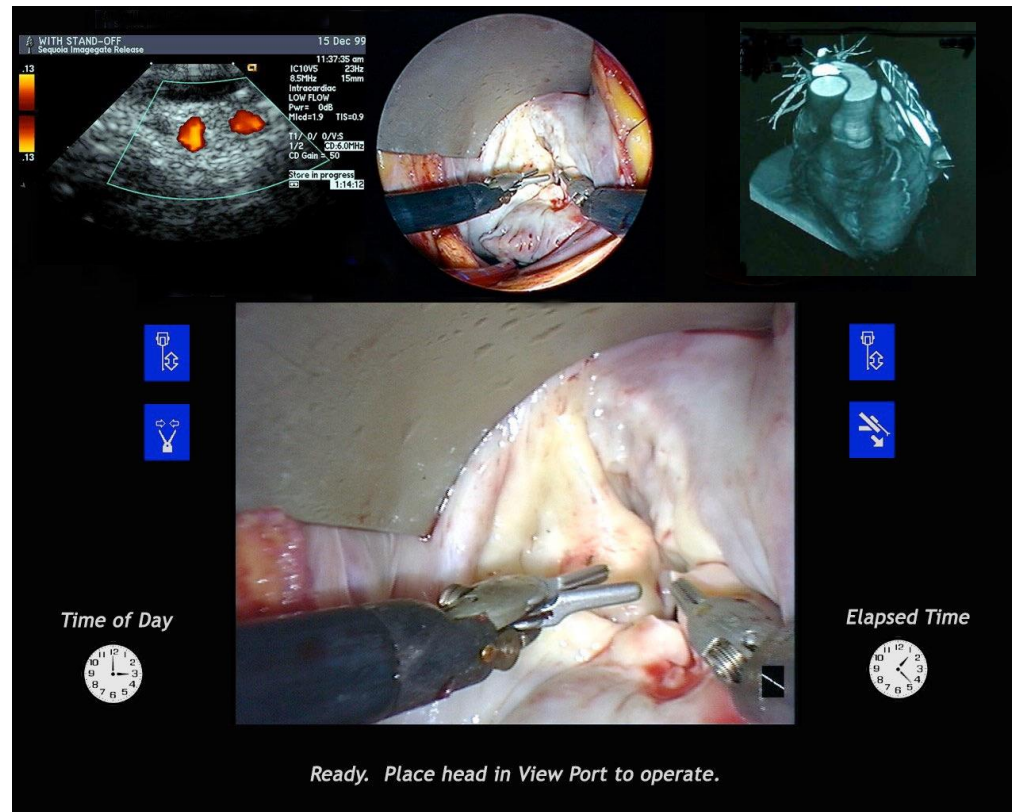


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## Setting boundaries in surgical fields

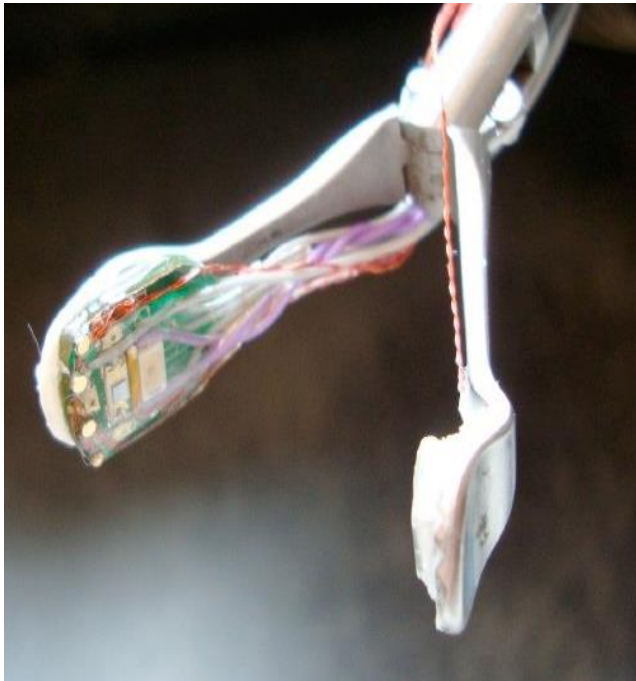


## High Resolution Display – Multiple Inputs





## Intelligent Instruments



bioROBOTICS LAB UNIVERSITY OF WASHINGTON PHILIP ROAN 03.11.10



Figure 14. A photograph showing the grasper measuring poorly vascularized tissue.

# CIRURGIA ROBÓTICA

O futuro



Lisboa, 21 de março de 2018

## An Information-Rich Surgical Environment

Integration, registration, and utilization of preoperative and real-time information:

- Fully integrated robotic platforms
- Higher resolution stereo displays
- Advanced software
- Augmented reality
- Artificial intelligence





**THE FUTURE OF SURGERY IS THE  
SAFE, ETHICAL, SELECTIVE AND INTELLIGENT  
INCORPORATION OF TECHNOLOGY  
FOR BENEFIT OF THE PATIENTS**



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**OBRIGADO**