

INTUITIVE  
SURGICAL®



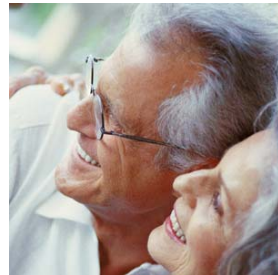
**da Vinci Si<sup>HD</sup>**  
SURGICAL SYSTEM

Intuitive Surgical  
Presentation to  
the Congressional  
Robotics Caucus -  
May 21, 2009



# Intuitive Surgical - Overview

- Founded in 1995
  - Employs ~1100 people worldwide, ~1000 people in the US
  - Publicly-traded company, NASDAQ "ISRG"
- Intuitive's *da Vinci* systems used in 136,000 procedures performed in 2008, up 60% from 2007
  - Q109 procedures up approximately 60% from Q108
- 1,171 *da Vinci*® System base as of 3/31/09
  - 863 United States, 211 Europe, 97 Rest of World
- FDA Clearances - Laparoscopic, Thoracoscopic, Prostatectomy, Cardiotomy, Revascularization, Urology, Gynecology, Pediatric
- Target Markets - Urology, Gynecology, Cardiothoracic, General Surgery



# Medical-Surgical Robotics

## *Definition*

- The use of computer-controlled mechanisms to improve therapeutic outcomes

## *Types of Medical-Surgical Robots*

- Medical and Surgical Aids - Surgery and patient care
- Radiation Therapy Robots - Accurate therapy delivery
- Guidance and Positioning Robots - Hands-on manipulator control
- Surgical Tele-robots - Human-in-control

## *Value Proposition: Better therapeutic outcomes resulting from initial capital investment*

- Better tissue targeting - higher precision
- Less invasive procedures - smaller access
- Reduced complications when compared to non-robotic procedures

# The Medical-Surgical Robotics Landscape (1)

## Medical and Surgical Robotic Aids



Rounding Robots  
- *InTouch RP7*

MIS Scope Holders  
- *Prosurge EndoAssist*



## Radiation Therapy Robots

Radiation Control Robots  
- *Accuray Cyberknife*



# The Medical-Surgical Robotics Landscape (2)

## Guidance & Positioning Robots

### Image-Guided Robots

- *CUREXO Robodoc*
- *Mazor SpineAssist*

### Hand Guidance/Haptic Walls

- *MAKO Surgical*



## Surgical Tele-Robots

### Catheter Guidance Robots

- *Hansen Sensei*
- *Stereotaxis Niobe*

### Minimally Invasive Robots

- *Intuitive Surgical da Vinci*





# Example: Intuitive's *da Vinci*® Si Tele-robot

## *Vision*

- 3D-HD view of the surgical field

## *Dexterity*

- Greater range of motion than the human wrist

## *Precision*

- Tremor reduction, motion scaling

## *Ergonomics*

- Improved positioning & surgeon comfort



*da Vinci*® Si- Video Overview

# Drivers for Adoption of Robotic Surgery

$$\text{Patient Value} = \frac{\text{Efficacy}}{\text{Invasiveness}^2}$$

Surgeon Value = Patient Value + ease-of-use  
+ dependability + shorter length-of-stay (LOS)

Hospital Value = Patient Value + Surgeon Value  
+ economic benefits for the hospital

Economic Value = Improved outcomes  
+ fewer complications + reduced LOS + fewer  
readmissions + faster return to normal activities



# Representative Procedure - *da Vinci*<sup>®</sup> Prostatectomy

## Reported Clinical Benefits of *da Vinci*<sup>®</sup> Procedures Versus Open Surgery

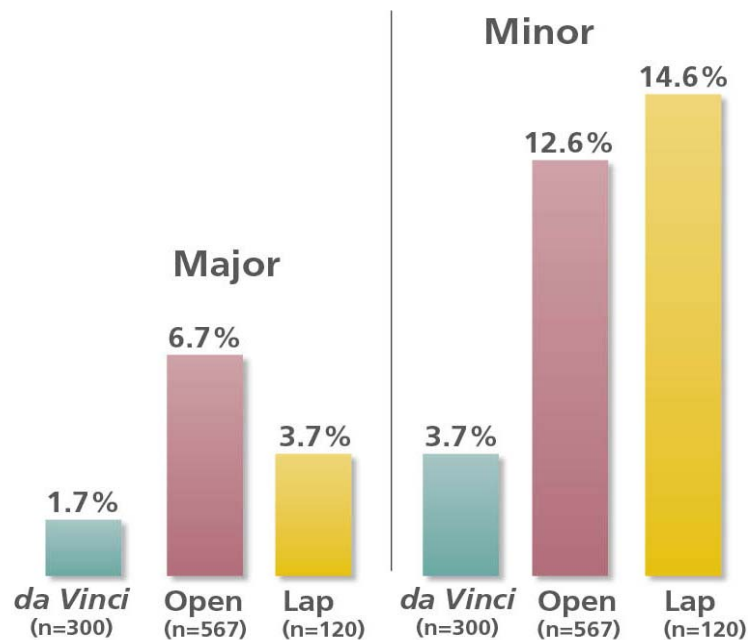
### *Greater Efficacy*

- Improved cancer control<sup>1</sup>
- Increased continence<sup>2</sup>
- Enhanced sexual potency<sup>3</sup>

### *Reduced Invasiveness*

- Reduced pain<sup>3</sup>
- Reduced blood loss<sup>4</sup>
- Reduced length of stay<sup>4</sup>

## Prostatectomy Complication Rate



<sup>1</sup>VR Patel. Urology Centers, Vestavia Hills, USA. Histopathologic Outcomes and Short Term PSA Data after Robotic Radical Prostatectomy. 500 Patients. Moderated Poster Session MP27, Wednesday, August 24, 2005. 23<sup>rd</sup> World Congress on Endourology and SWL 21<sup>st</sup> Basic Research Symposium August 23-26, 2005, Amsterdam, The Netherlands. J Endourol. 2005 Aug.; 19, Supplement 1: A135.

<sup>2</sup> T Ahlering. Continence: The UC Irvine Experience. Presented at UC Irvine's 2006 ART (Advanced Robotic Techniques) of Prostatectomy Symposium, January 5, 2006, Anaheim, California

<sup>3</sup> Menon M, Kaul S, Bhandari A, Shrivastava A, Tewari A, Hemal A. Potency following robotic radical prostatectomy: a questionnaire based analysis of outcomes after conventional nerve sparing and prostatic fascia sparing techniques. J Urol. 2005 Dec;174(6):2291-6, discussion 2296. p. 2293 fig. 2.

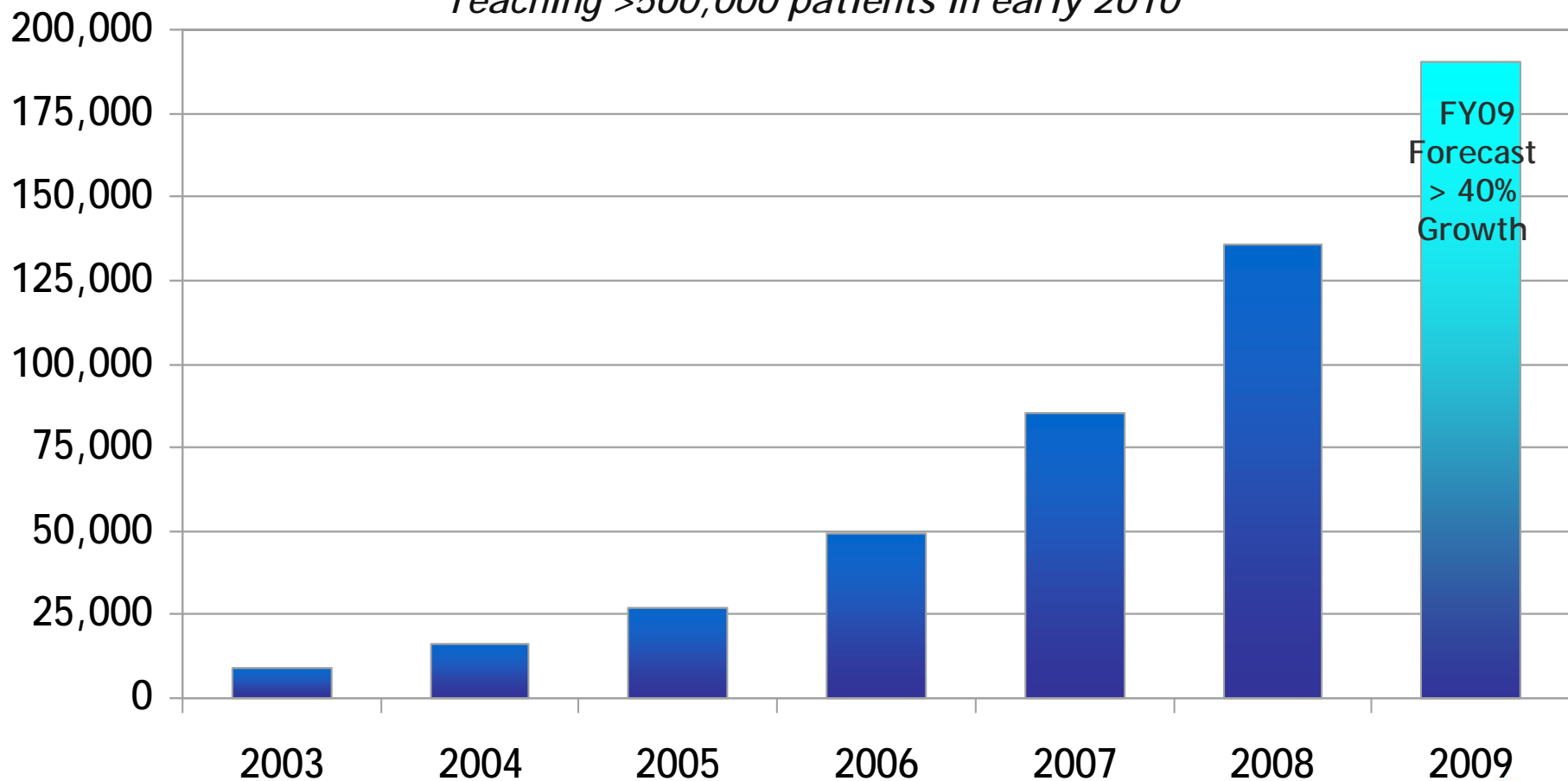
<sup>3, 4</sup> Menon M, Tewari A, Peabody JO, Shrivastava A, Kaul S, Bhandari A, Hemal AK. Vattikuti Institute prostatectomy, a technique of robotic radical prostatectomy for management of localized carcinoma of the prostate: experience of over 1100 cases. Urol Clin North Am. 2004 Nov;31(4):701-17. Review.

\* Comparative prostatectomy results from: Bhandari A, J Urology 2000; Brown JA, Urologic Oncology, 2004; Guillonneau B, Jnl of Urology, 2002.



# Annual Worldwide daVinci Procedures

*Cumulative total of ~300,000 da Vinci patients through 2008, reaching >500,000 patients in early 2010\**



\* Forecasts based on Company estimates.

# Procedures Performed with daVinci

## Urology

Prostatectomy  
Nephrectomy  
Partial Nephrectomy  
Pyeloplasty  
Cystectomy  
Donor Nephrectomy  
Ureterolithotomy  
Pelvic Lymphadenectomy  
Adrenalectomy  
Cystocele Repair  
Excision of Renal Cyst  
Lymphadenectomy  
Testicular Resection  
Renal Cyst Decortication  
Ureteral Transplant  
Nephropexy  
Ureterectomy  
Rectocele Repair  
Varicocele  
Ureteroplasty  
Ureteral Implantation  
Vaso-vasostomy

## Gynecology

Hysterectomy  
Myomectomy  
Sacral Colpopexy  
Pelvic Lymphadenectomy  
Tubal Reanastomosis  
Vaginal Prolapse Repair  
Dermoid Cyst  
Endometrial Ablation  
Oophorocystectomy  
Oophorectomy  
Ovarian Cystectomy  
Ovarian Transposition  
Salpingectomy  
Salpingo-Oophorectomy  
Colposuspension (Burch)  
Tubal Ligation  
Tubalplasty

## Cardiothoracic

Mitral Valve Repair & Replacement  
Single Vessel Beating Heart Bypass  
Multi-Vessel Beating Heart Bypass  
Single Vessel Arrested Heart Bypass  
Multi-Vessel Arrested Heart Bypass  
IMA Harvesting  
Coronary Anastomosis  
Atrial Septum Aneurysm  
Atrial Septal Defect Repair  
Tricuspid Valve Repair  
Thrombectomy  
Thymectomy  
Esophagectomy  
Pericardial Window  
Lobectomy  
Pneumonectomy  
Pacemaker Lead Implantation  
Mediastinal Resection  
Pulmonary Wedge Resection

## General

Gastric Bypass  
Nissen Fundoplication  
Heller Myotomy  
Gastrectomy  
Colon Resection  
Thyroidectomy  
Arteriovenous Fistula  
Toupet  
Pancreatectomy  
Adrenalectomy  
Hemi-Colectomy  
Sigmoidectomy  
Splenectomy  
Pyloroplasty  
Gastroplasty  
Appendectomy  
Intra-rectal Surgery  
Bowel Resection  
Lumbar Sympathectomy  
Liver Resection  
Cholecystectomy  
Hernia Repair

# Where Are We Now?

- *Growing Market*
  - 6 companies in the US market today
  - Many more working to bring new products to the market
- *Substantive and Growing Clinical Literature*
  - Over 1400 articles demonstrating equivalent or better outcomes, decreased trauma and decreased complication rates across many different procedures
- *Compelling Value Proposition*
  - Initial capital investments result in reduced hospital stays, decreased complication rates leading to decreases in re-admissions, and faster return to normal life for patients
  - Primary savings from hospital operating costs, increased productivity, and avoided cost of capital for hospital facilities
  - Within a few years, and with modest assumptions, net benefits in the US would total billions of dollars annually

# Medical Robotics Presents a Substantial Opportunity

- Medical Tele-robots alone could be a \$4 Billion annual industry
- Government sponsored programs exist to create medical robots to compete in world markets in at least
  - Japan
  - Canada
  - Korea
  - Singapore
  - Great Britain
  - France
  - Germany

# What Does the Future Hold?

## *Future Innovations in Surgical Robotics...*

- Improved capability through fewer, smaller incisions
- Integrated imaging for diagnostics and therapeutics
- Advanced delivery of focal therapies



## *Leading to More Applications, Increased Benefits...*

- Expanded set of robotic-minimally invasive procedures
- Greater access to higher quality care—for rural and smaller urban areas, and in military uses, e.g., bases and naval ships
- Improved healthcare outcomes overall
- Broader economic benefits





# What Was Required for Early Entrants to Get Here?

## *Coordinated Public-Private Effort*

- Collaborative projects with early government support laid the foundation for a new industry

## *Long-Range Vision for Government and Investors*

- Intuitive's evolution (and that of other surgical robotics companies) depended on "patient" investment

## *Hospital Vision in Adopting Innovative Technologies*

- Early adopters provided patients with new treatment options while ensuring safety, efficacy, and cost-effectiveness
- Leaders "saw beyond" accounting practices that distort the impact of new technologies and fail to account for patient benefits

# What Does the Industry Need Moving Forward?

## *Strong Commitments to Technology Leadership*

- Delivering globally competitive medical robots will require on-going R&D and commercialization-focused investment

## *Cross-Agency Coordination and Support*

- Surgical robotic technologies cut across a variety of disciplines and agency missions, making coordination of efforts essential

## *Thoughtful Approaches to Comparative Effectiveness Research and Healthcare Economics*

- Robotics demonstrates increased clinical performance AND reduced end-to-end cost to treat—a cross-treatment-cycle view of costs and benefits is required

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Thank You

