



**Jaimy**  
*Motorized Laparoscopic Instrument*



**viky ep**  
*Endoscope Positioner*



**viky up**  
*Uterus Positioner*

## Robotique Médicale & Industrie

GDR Robotique/GDR Stic-Santé  
21 juin 2013, Paris

# Création

## Endocontrol

EIDOS

ViKY

JAiMY

Les défis

PME innovante spécialisée dans les systèmes robotiques pour l'assistance à la chirurgie mini-invasive:

- Créée en 2006 par Clément Vidal et Patrick Henri
- Basée à Grenoble
- 10 salariés
- Présence internationale: France, Allemagne, Angleterre, Espagne, USA, Japon, Russie...



# Rappel: Chirurgie Laparoscopique



Endocontrol

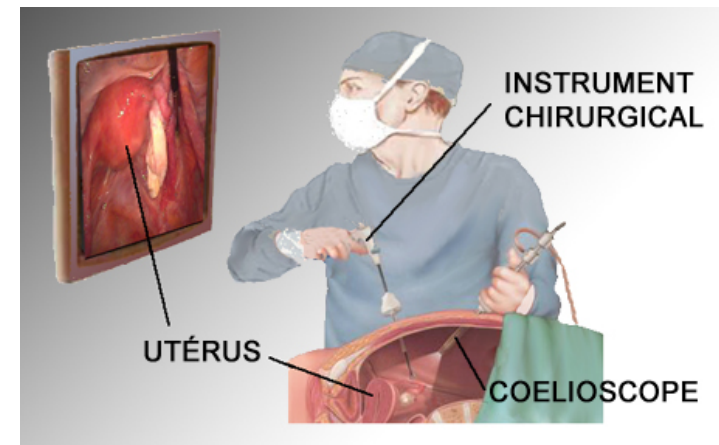
EIDOS

VIKY

JAiMY

Les défis

- **Principe:**
  - Réalisation de plusieurs petites incisions (de l'ordre du cm)
  - Insuflation de CO<sub>2</sub>
  - Chirurgie réalisée à l'aide d'instruments longs et rigides
  - Vision fournie par un endoscope via un moniteur
- **Difficultés pour le chirurgien:**
  - Manipulation de l'endoscope par une tierce personne
  - Manipulation des instruments
  - Absence de sensation tactile direct
  - Vision déportée
  - Vision 2D
- **En routine:** appendicectomie, cholécystectomie, néphrectomie, prostatectomie
- **En chiffres:**
  - 2.48 millions aux USA
  - 1.18 millions en Europe (2011)



# Notre concept: Plateforme robotique EiDOS

Endocontrol

EiDOS

ViKY

JAiMY

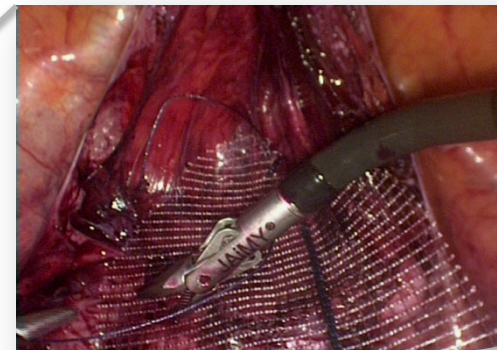
Les défis

Il s'agit d'une plateforme modulable composé d'un porte-endoscope ViKY et d'un ou plusieurs instruments robotisés JAiMY pour:

- Offrir tous les bénéfices d'une assistance robotisée
- A moindre coût

## Intérêts:

- Polyvalence
- Compatible avec les instruments existants
- Evolutivité et adaptabilité à l'innovation clinique



# EiDOS reconnu par les experts

Endocontrol

EiDOS

ViKY

JAiMY

Les défis

“ALTERNATIVE SOLUTION TO CURRENT MIS ROBOTIC SYSTEMS”  
EUROPEAN ASSOCIATION OF UROLOGY BEST VIDEO  
3<sup>RD</sup> PRIZE – MARCH 2013



# ViKY - Principes

Endocontrol

EIDOS

ViKY

JAI MY

Les défis



Le chirurgien controle ViKY® au pied (via une pédale) ou à la voix.

Le robot est attaché à la table d'opération et positionné sur le patient.

Le système est autoclavable et donc réutilisable.

3ddl

## Bénéfices cliniques

- COMPACTE
- Le chirurgien a le CONTROL DIRECT de la VISION
- STABILITE de l'image pour une meilleure qualité vidéo
- LIBERE UNE MAIN de l'assistant

# ViKY – De la preuve de concept au produit industriel

Endocontrol

EIDOS

ViKY

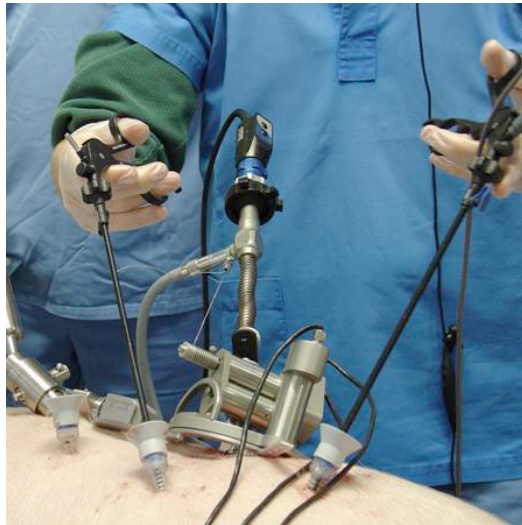
JAiMY

Les défis

- Identification du besoin
- Preuve de concept par le laboratoire TIMC-IMAG à Grenoble



- 2006 Création d'Endocontrol
- Licence exclusive d'exploitation



# ViKY – De la preuve de concept au produit industriel

Endocontrol

EIDOS

VIKY

JAiMY

Les défis

## Fin 2007

- Premier prototype industriel (intégration/IHM/Certifications)
- Marquage CE
- Première chirurgie

## 2008

- Lancement commercial
- Approbation FDA



- **2010** Evolution de la gamme + ViKY UP
- **2012** Contrat avec Trumpf



# JAI MY - Principes

Endocontrol

EIDOS

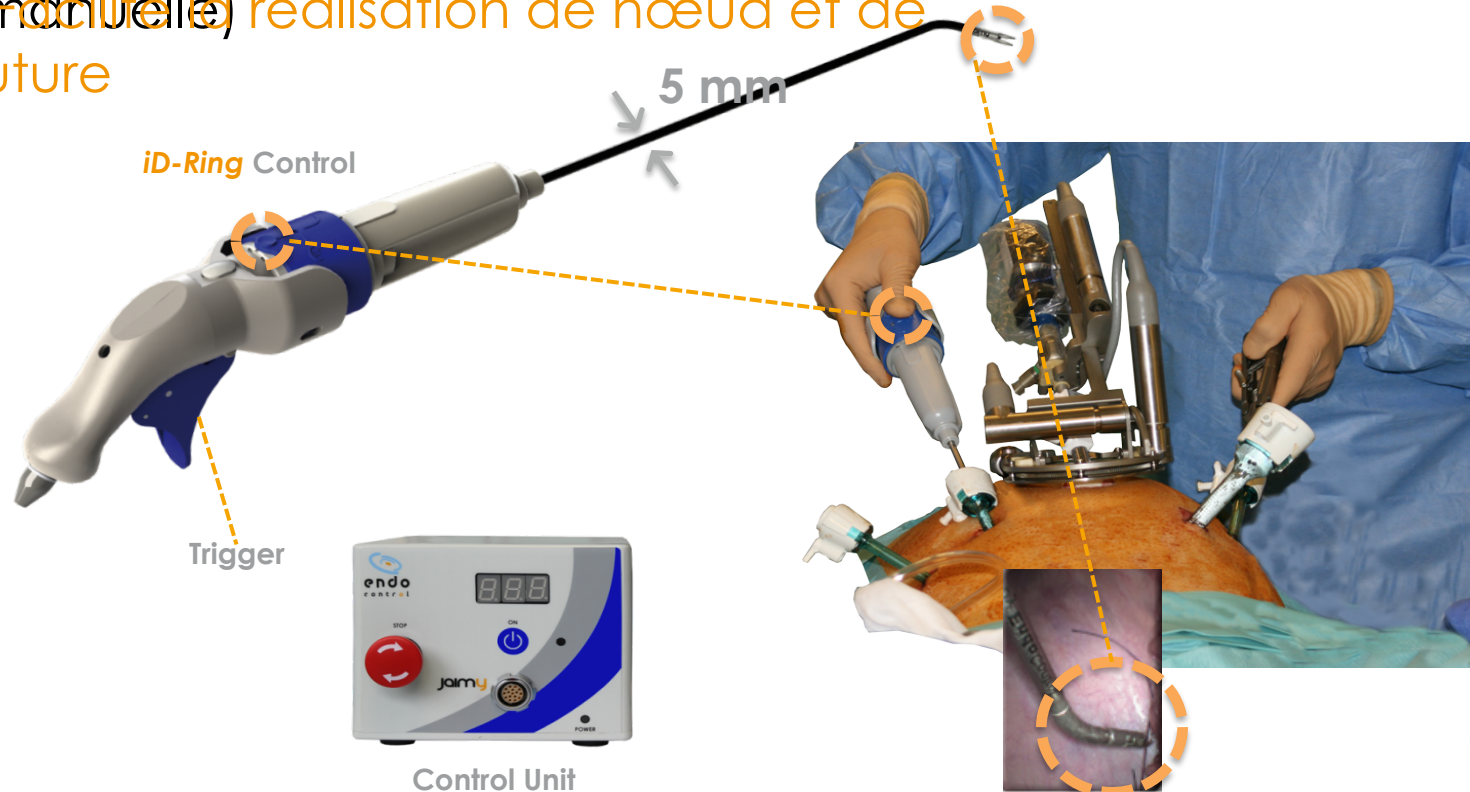
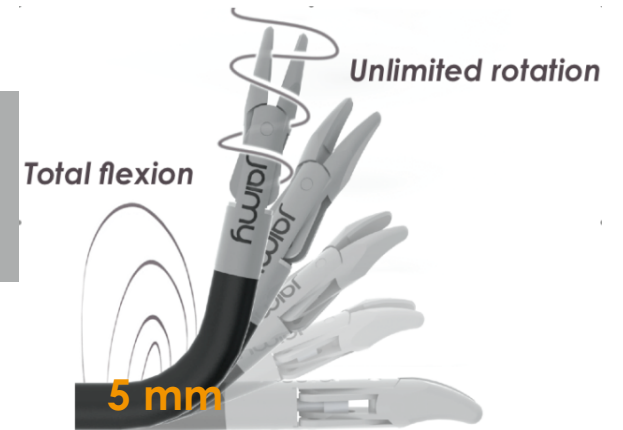
VIKY

JAI MY

Les défis

**Bénéfices cliniques** :  
- Guidage rigide de 5mm à 3 ddl:

- Flexion distale unilatérale
- Rotation distale illimitée
- Fermeture/ouverture de la pince (manuelle) réalisation de nœud et de suture



# JAiMY – Du besoin au produit industriel

Endocontrol

EIDOS

ViKY

JAiMY

Les défis

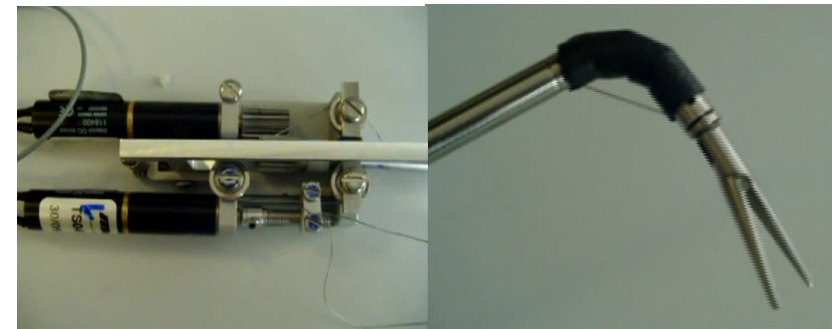
## 2008

- Identification d'un besoin
- Définition clinique avec les chirurgiens
- Soumission de la problématique à un laboratoire de recherche (ISIR)



## 2010

- Preuve de concept
- Brevet commun
- Licence exclusive d'exploitation



# JAI MY – Du besoin au produit industriel

Endocontrol

EIDOS

VIKY

JAI MY

Les défis

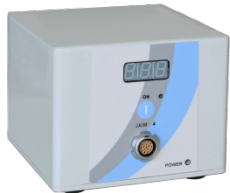
**2009** Premiers prototypes

**2010**

- Présérie et certifications
- Marquage CE
- Première chirurgie



**2012** Lancement réservé à quelques centres cliniques



# Publications cliniques

## ABSTRACTS:

### ABSTRACT 24 – BEST PAPER AWARD

#### INNOVATIVE COMBINATION OF NEW TECHNIQUES FOR RECONSTRUCTIVE LAPAROSCOPIC SURGERY: ANIMAL MODEL

Georges-Pascal Haber, Yi-Chia Lin, Philippe Koenig, Kazumi Kam Robert Stein, John Kefer, David Canes, Raj Goel, Mihir Desai, Department of Urology, Glickman Urological Institute, Cleveland

**Introduction:** Herein we present a combination of a new robotic-endoscope holder, perform laparoscopic reconstructive urological surgery.

**Methods:** Ten dismembered pyeloplasty (LPP), 10 urethro-vesical anastomosis (UVA) were performed in 10 farm pigs using this combination of the following three techniques (EndoControl, Grenoble, France) a novel small light robot fixed to the OR table (Diego, USA) is displayed on a 3D screen, and/or a personal head display, and/or 3) The articulated instrument (Radius Surgical System, Tuebingen Scientific, 5) rotatable tips that provide 6-degrees of freedom. The stability and compatibility estimated blood loss (EBL), complication, and quality of the sutures were recorded



**Results:** All the procedures were accomplished successfully. All the 3 techniques instrument failure was noted in all the procedures. The mean OR time for LPP was 7 ± 4 cc. Tissue laceration and anastomosis occurred in the 3 first cases. The mean suturing time for the UVA was 32 ± 9 min in 20 min at the end of the learning curve (p=0.0004); EBL was 8 ± 7 cc, we not at autopsy we did not found any tissue laceration but 3 anastomotic leaks at the r OR time for LPN was 104 ± 30 min, warm ischemia time was 26 ± 6 min and (p=0.019). EBL was 40±23 cc. Intra-operative complications included 1 renal vein minimal tissue laceration were noted.

**Conclusions:** The combination of robotic-endoscope holder, 3-D vision and articulated laparoscopic urological surgery represents an effective alternative to manual techniques afforded by current robotic surgical systems. The combination of these techniques and tactile feedback is under investigation.



**Laparo-end LightWeight™**  
Sarah Kane - Kevin

Received: 8 November 2008  
© Springer-Verlag London

**Abstract** Current laparoscopic techniques require a single incision in the abdominal wall. Each incision carries a risk for port site hernia, and in an effort to reduce this risk, devices have been developed that allow for a single incision. These devices can provide an alternative to the conventional multi-incision approach. In this case report, we describe our experience with the VCare robotic endoscope holder in a porcine model. This device consists of a single incision in the abdominal wall, and allows for a single operator control of all instrumentation. The novel use of this robotic device demonstrates a potential decrease in the need for surgical assistants and thus a decrease in cost. When combined with single-site laparoscopy, it also allows the surgeon complete control of the operative environment and may enable more surgeons to embrace the single-incision technique.

**Keywords:** Hysteroscopy; Laparo-endoscopic single-site surgery (LESS); Robotic assistants

## Robotic assistance for keyhole surgery

As an increasing number of surgeons are being forced to operate without an assistant, could robotic assistance help to address the impact of the European Working Time Directive? The Clinical Services Journal reports on the latest developments in robot-assisted laparoscopic surgery.

The Royal College of Surgeons has recently carried out research into how the European Working Time Directive (EWTD) has impacted the NHS, one year since it was implemented. One of the most important conclusions from the study showed that almost two-thirds of surgeons are now forced to operate without an assistant, as there are simply not enough junior doctors to go round. However, last year, a new robotic device used to assist laparoscopic surgery was approved for use in Europe and the US, which not only made robotic technology affordable, but offered the potential to overcome the unintended consequences of limiting junior doctors' hours.



Journal of Robotic Surgery  
April 2013

## A pilot study of robotic vault manipulation: the VIKY™ Positioner™

Nikolaos Akrivos, Peter Barton-Smith

### Abstract

A pilot study of uterine and vaginal vault manipulator Uterine Positioner™—enrolled 36 cases comprising sacrocolpopexies and one excision of severe endometriosis in a tertiary referral District General body mass index 25.7 kg/m<sup>2</sup> and uterine weight 23 Bluetooth voice control. VIKY UP™ docking time of device caused no peri-operative complications. Adequate movement was possible in 81, 78 and 61 % of cases arising in cases with uterine weight >350 g. VIKY UP™ required in three cases, whilst V-Care™ came out of the uterus in one case. The learning curve led to various adjustments including optimizing patient position, increasing the device range of movement and adjusting device sensitivity. As a result, problems were minimized in our last nine cases. Adding robotic uterine manipulation is the obvious next step to give the gynecologist the ultimate control and stability of the uterus during robotic-assisted surgery without having to lift their head from the viewfinder or rely on a remotely situated perineal assistant. VIKY UP™ is the first device to deliver this. Pilot study results did not demonstrate compromised safety, and the device appears to be effective and easy to learn.

TEC

I have carried out 60 laparoscopic operations now carry out surgery alone, without the need for an assistant.

... thereby saving hours of my and money. I am able to focus my junior surgeon better and concentrate more on the operation without needing to hold the camera. I have carried out over 60 laparoscopic operations using this technology and can now carry out laparoscopic surgery alone, without the need for an assistant. Previously, a prostatesctomy required two assistants, now I can do it alone, but before the device was used.



Gynecol Surg  
DOI 10.1007/s10970-011-0684-6

### TECHNIQUES AND INSTRUMENTATION

#### Single-port hysterectomy with pelvic lymph node dissection in the porcine model: feasibility and validation of a novel robotic lightweight endoscope positioner

Pedro F. Escobar · Jason Knight · Matthew Krub · Srirachan Chalkonda · Jihad Kaouk · Robert Stein



The London clinic inspired care

St George's Healthcare NHS Trust

Thomas Ind  
Royal Marsden Hospital, St George's Hospital & The London Clinic, London, UK

#### Introduction

Straight stick laparoscopic procedures often rely on uterine manipulation and an assistant to hold a camera. Inevitably the picture quality can become poor due to loss of concentration or unsteadiness from either the uterine manipulator or camera holder.

A number of uterine manipulator systems exist along with a number of different camera holding devices. The VIKY™ (Trumpf GmbH, Munich, Germany) can robotically control both a VCare™ uterine manipulator (ConMed, Utica, NY) and a laparoscope.

We report our early experience of using two VIKY™ robotic devices at the same time allowing the laparoscopic surgeon to operate without a surgical assistant while performing straight stick surgery.

#### METHODS AND RESULTS

Three patients have had operations using 'Double VIKY' robots. In each case the VCare uterine manipulation was controlled by a foot pedal and the laparoscopic holder was controlled using a Bluetooth microphone and voice recognition. The voice recognition software had to be pre-programmed with a 15 second update each time the system is used. An attempt was made to record the setup times for connecting the device but as they were so short (a minute or two) reliable times could not be recorded. The usual set-up involved a 32mm umbilical port, a 5mm suprapubic port, and a 5mm port in the left lateral position (see figure). In none of the cases were additional disposable items used.

**Case 1** – Laparoscopy and excision of endometriosis. 41 years old. No complications.

**Case 2** – Laparoscopy and ovarian cystectomy. 8cm dermoid cyst. Cyst was retrieved intact in a bag through the 10mm port. During retrieval a 5mm scope was placed in the lateral 5mm port and the laparoscopic VIKY attached to it. 30 years old. No complications.

**Case 3** – Laparoscopy, ovarian cystectomy and excision of deep endometriosis. 6cm dermoid cyst. Cyst was retrieved intact in a bag through the 10mm port. During retrieval a 5mm scope was placed in the lateral 5mm port and the laparoscopic VIKY attached to it. 37 years old. No complications.

#### CONCLUSIONS

- Straight stick laparoscopic surgery is feasible using the Double VIKY technique.
- Many features are preferable to using human assistants.
- Set up times are quite quick.
- In addition, it might be preferable for teaching by detaching the trainee from other roles in theatre allowing them on the surgeon's side of the patient.

Innovations in the field of robotics have led to more mobile, versatile devices that provide a less cumbersome and less expensive alternative to the conventional multi-arm, surgeon-separated robot devices. The VIKY™ System "Vision Control for endoscopy"™ (Endocontrol Medical, La Tronche, France) is a revolutionary compact mechanical endoscope holder for all laparoscopic surgeries [1]. The technology, developed in France and tested on thousands of patients in Europe, has been used for oncology, gastrointestinal, urologic, thoracic, and gynecologic procedures. Since its approval by the U.S. Federal Drug Administration in May 2009, centers in the USA have begun to utilize the

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available at www.sciencedirect.com  
journal homepage: www.europeanurology.com



#### Case Series of the Month

#### Robotic Transrectal Ultrasonography During Robot-Assisted Radical Prostatectomy

Andrew J. Hung, André Luis De Castro Abreu, Sumas Shoji, Abhin C. Goh, André K. Berger, Mihir M. Desai, Monish Aron, Adheriv S. Gill, Osamu Ukimura

USC Institute of Urology, Beck School of Medicine, University of Southern California, Los Angeles, CA, USA

#### Article info

#### Abstract

We evaluate the use of robotically manipulated transrectal ultrasound (TRUS) for real-time monitoring of prostate and periprostatic anatomy during robot-assisted prostatectomy (RAP). Ten patients with clinically organ-confined prostate cancer undergoing RAP underwent preoperative and real-time intraoperative bipolar TRUS evaluation using a robotically manipulated TRUS device (VIKY System; EndoControl Medical, La Tronche, France). Median prostate volume was 53 cc (range: 38–85). Serum prostate-specific antigen (PSA) was 5.3 (range: 1.3–17.9), and four patients (40%) had clinical high-grade and high-stage disease. Median intraoperative TRUS evaluation was performed in nine patients (90%). Median time for VIKY System setup to insertion of the TRUS probe was 7 min (range: 4–12). Complete robotic TRUS evaluations were successful in all patients. Five patients (50%) had TRUS-visible hypoechoic lesions, confirmed carcinoma on preoperative biopsy. Relevant intraoperative TRUS findings were relayed in real time to the robotic surgeon, particularly during dissection of the bladder neck and prostatic urethra, and during anatomical bladder preservation, and when hypoechoic prostatic lesions approximated nerve-preserving dissection. Negative margins were achieved in nine patients (90%), including cases where significant intraoperative lesions abutted or extended through the prostatic capsule. No complications occurred. We conclude that real-time robotic TRUS guidance during RAP is feasible and safe. Robotic TRUS can provide the console surgeon with valuable anatomic information, thus maximizing functional preservation and oncologic success.

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Corresponding author: USC Institute of Urology, 1441 Eastlake Avenue, Suite 7416, Los Angeles, CA 90009, Tel: +1 323 865 2700; Fax: +1 323 865 0200; E-mail address: ahung@usc.edu (A. Hung).

including posterior bladder neck transection, neurovascular bundle (NVB) preservation, and apical dissection, are performed solely with visual cues. Furthermore, cancer abutting the prostatic capsule or focally extending into periprostatic tissue increases the risk of positive surgical margins (PSMs). Transrectal ultrasound (TRUS) is widely used for real-time robotic TRUS guidance during RAP to facilitate and safe. Robotic TRUS can provide the console surgeon with valuable anatomic information, thus maximizing functional preservation and oncologic success.

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http://dx.doi.org/10.1016/j.eururo.2012.04.022

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http://dx.doi.org/10.1016/j.eururo.2012.04.022

SURGICAL TECHNOLOGY INTERNATIONAL XX

## Robotic Uterine Manipulation Technologies

IBREY SWAN, MD  
FACOG, GYN ONCOLOGIC SURGERY  
PITAL CELEBRATION HEALTH  
BRISTON, FLORIDA

JOHN KIM, MD  
GYN ONCOLOGIC SURGERY  
PITAL CELEBRATION HEALTH  
BRISTON, FLORIDA

D E ADINCHILA, MD  
ONCOLOGIC & GYN ONCOLOGY  
PITAL CELEBRATION HEALTH  
BRISTON, FLORIDA

ic and robot-assisted gynecologic surgeries continues to rise, as become increasingly important. Currently described resistant manual manipulation by the surgeon or surgical assistant personnel, increases fatigue levels, and decreases patient safety. The use of robotic uterine manipulation devices that can improve these measures: the Uterine Manipulator™ (La Tronche, CT) and the VIKY UP™ "Vision Control for Uterine Manipulation"™ (La Tronche, France). Both provide accurate and

positioning. The UPS can manipulate the uterus with minimal bedside involvement from the surgeon. The VIKY UP provides uterine manipulation through a robotic arm controlled by the surgeon remotely. These two devices can facilitate a multitude of conventional laparoscopic and robot-assisted gynecologic surgeries.

# Défis techniques- Du proto au bloc opératoire

Endocontrol

EIDOS

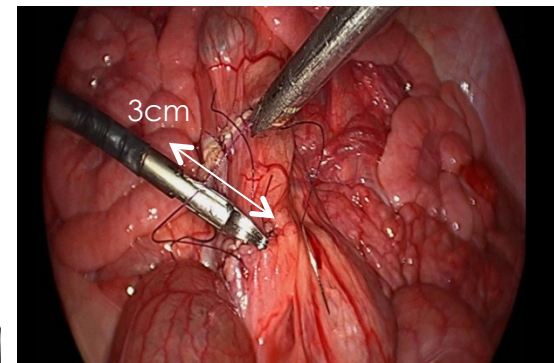
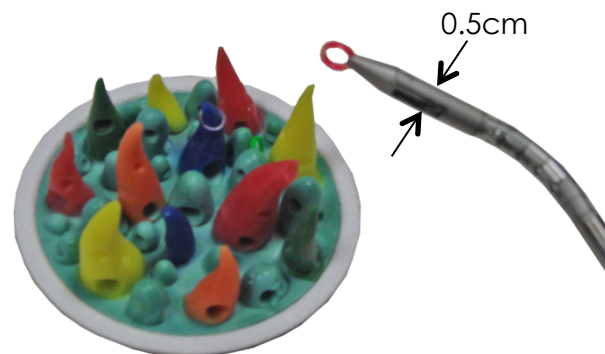
ViKY

JAIiMY

Les défis

La robotique médicale est un domaine **multi-disciplinaire** (mécanique, électronique, informatique) qui doit faire face à de nombreuses contraintes:

- Miniaturisation
- Contraintes de la stérilisation
- Matériaux biocompatibles
- Certifications/Normes
- Coût
- Collaboration avec les cliniciens



# Innovations – Projets collaboratifs

Endocontrol

EIDOS

ViKY

JAiMY

Les défis

Projets collaboratifs entre académiques et industriels:

- Mise à disposition d'une plateforme robotique adaptable en fonction des besoins du projet

- Innovation

○ PERSEE

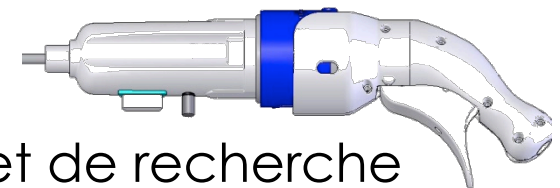
Endomicroscopie confocale robotisée

JAiMY se transforme en instrument d'imagerie

○ DEPORRA

Console d'enregistrement synchronisée pour le suivi d'instrument

○ Customisation à la demande pour projet de recherche spécifique (LIRMM)





**Jaimy**  
*Motorized Laparoscopic Instrument*



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*Uterus Positioner*