

# What's the Future of Robotic Bariatric Surgery and Robotics Overall?

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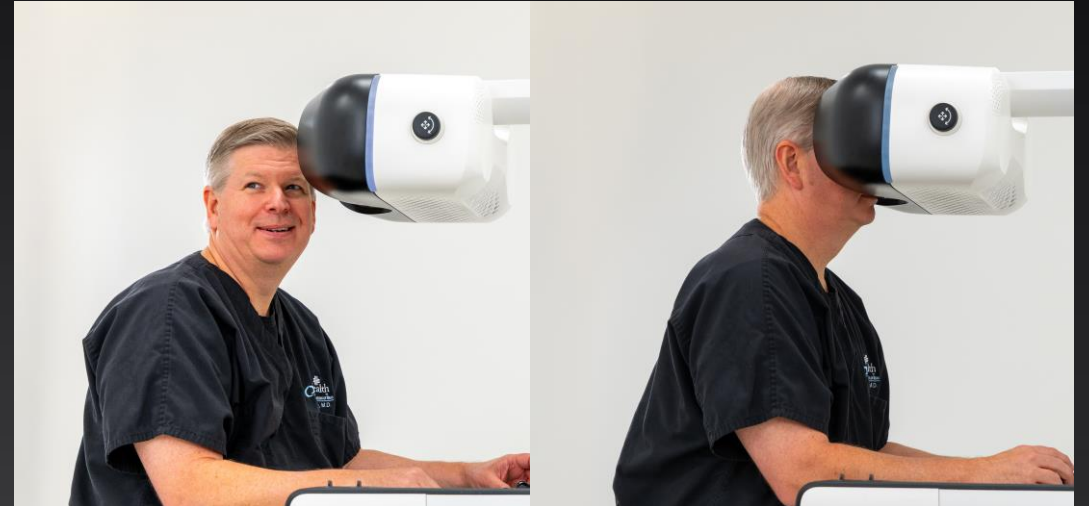
University of Texas Medical School at Houston



# My Disclosures

Johnson&Johnson-Teaching/Research: National PI in the Ottawa Trial

- \* Medtronic-Research
- \* Intuitive-Teaching
- \* Gore-Teaching
- \* Activ Surgical-Research
- \* Boston Scientific-Teaching/Research
- \* Endogenex-Research
- \* GI Windows-Chief Medical Officer



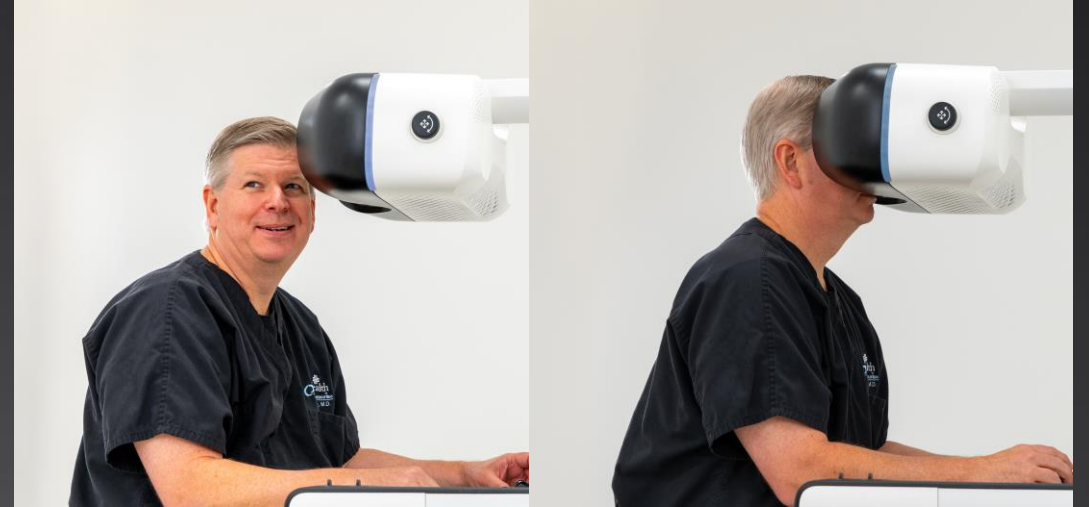
**OTTAVA System**

# What I Cannot Disclose

Photos/Videos of the OTTAVA system

Details or Data about the Trial or Its Cases

- \* Other Trial sites or Investigators
- \* Timing of Finishing the Trial, FDA De Novo Submission and Commercial Launch

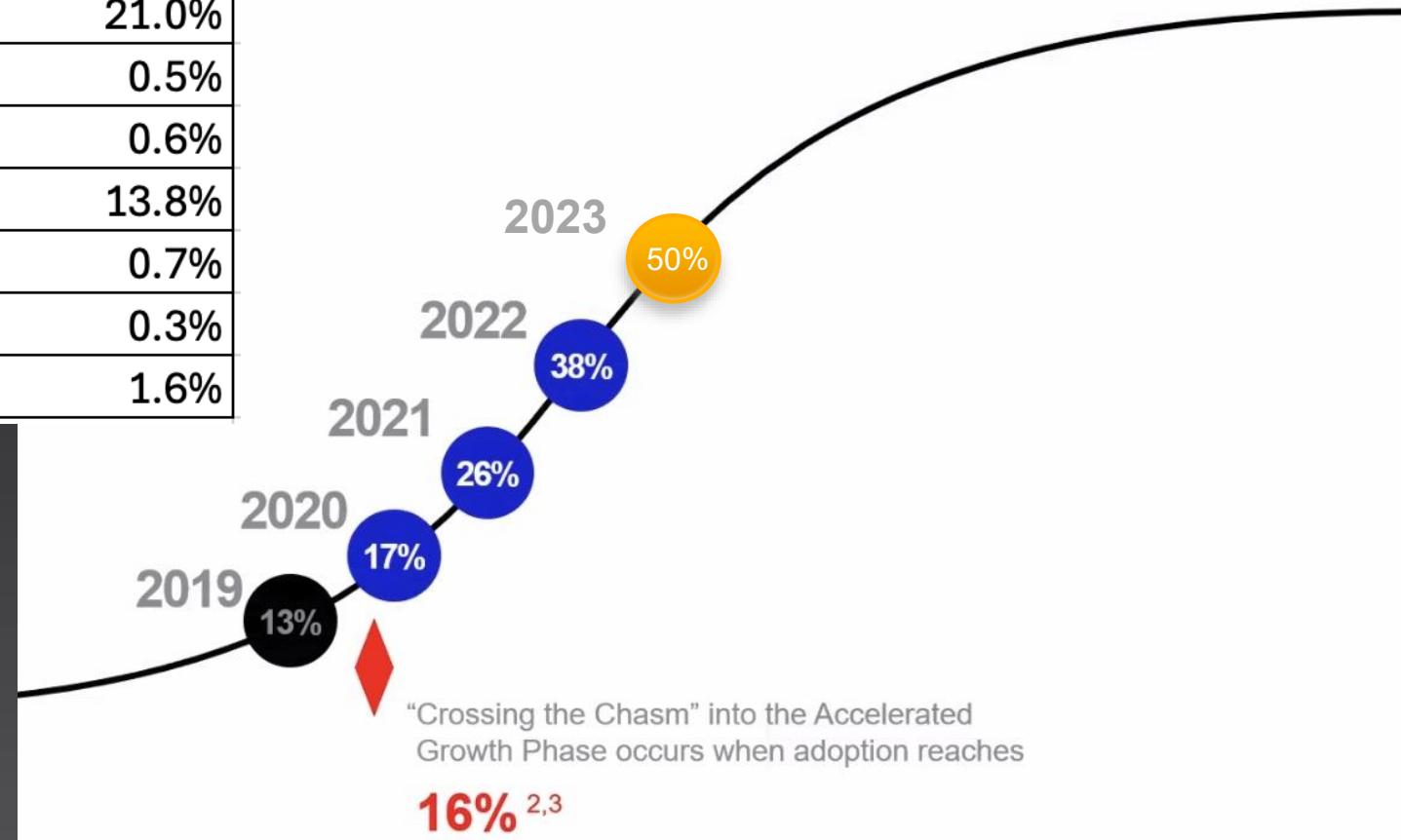


# Democratizing Surgery and Bariatric Surgery with Robotic Platforms

Laparoscopic Trends

	2020	2021	2022	2023
Sleeve	63.2%	59.2%	59.5%	61.5%
RYGB	19.4%	19.8%	19.9%	21.0%
Band	1.1%	0.5%	1.3%	0.5%
BPD-DS	1.4%	1.7%	1.9%	0.6%
Revision	12.9%	14.0%	13.1%	13.8%
SADI	0.3%	0.5%	0.7%	0.7%
OAGB	0.9%	0.6%	0.5%	0.3%
Other	0.8%	3.8%	3.1%	1.6%

## Growing Robotic Bariatric Surgery with Increasing Complexity



Robotic Increasing Anastomotic Cases:

Less sleeves more Bypass and Switch from 2020 to 2025 from Robotic Bari Surgeons

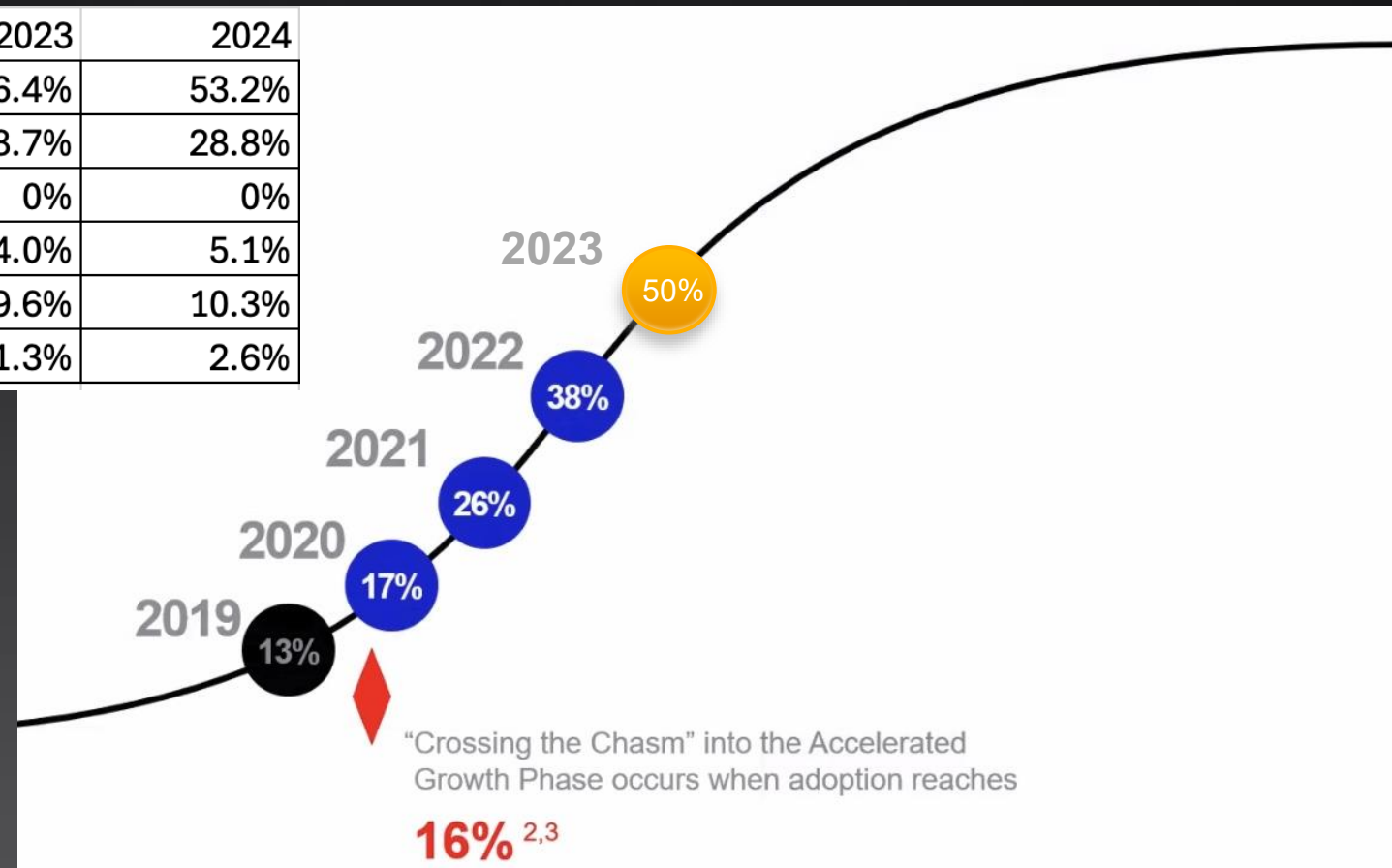
Thank You Intuitive!

# Democratizing Surgery and Bariatric Surgery with Robotic Platforms

## Growing Robotic Bariatric Surgery with Increasing Complexity

Robotic Trends

	2020	2021	2022	2023	2024
Sleeve	61.0%	60.7%	58.7%	56.4%	53.2%
RYGB	29.0%	29.3%	29.6%	28.7%	28.8%
Band	0%	0%	0%	0%	0%
BPD-DS / SADI	6.5%	6.5%	3.5%	4.0%	5.1%
Revision	3.5%	3.5%	7.9%	9.6%	10.3%
Other	0.0%	0.0%	0.5%	1.3%	2.6%



Robotic Increasing Anastomotic Cases:

Less sleeves more Bypass and Switch from 2020 to 2025 from Robotic Bari Surgeons

Thank You Intuitive!

# Evolution of Robotic Platforms



1999



**da Vinci®**

- Eliminates lap compromises
- Introduction of 4<sup>th</sup> arm (2003)
- Simple instruments

2006



**da Vinci® S™**

- 3D HD Vision (720p)
- Cross-quadrant access
- Streamlined set-up

2009



**da Vinci® Si™**

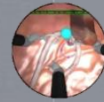
- Dual Console option
- Enhanced HD Vision (1080i)
- Upgradable architecture

2014

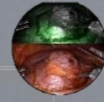


**da Vinci® Xi™**

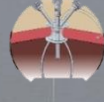
- Multi-quadrant access
- Crystal clear 3D HD vision
- Platform for future technologies



• FIREFLY™



• SINGLE-SITE™



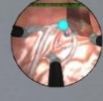
• SKILLS® SIMULATOR™



• ADVANCED INSTRUMENTATION



• FIREFLY™  
(EXPECTED MID 2014)



• XI SKILLS SIMULATOR™  
(AVAILABLE NOW)



• INTEGRATED ENERGY  
(AVAILABLE NOW)



• VESSEL SEALER  
(EXPECTED MID 2014)



• STAPLER  
(EXPECTED MID 2014)



• FUTURE INNOVATION  
SINGLE PORT SURGERY

# Democratizing Robotic Platforms with Bariatric Surgical Cases

5 generations of DaVinci and where are we?

A large boom arm system that has marginally changed in function  
Stronger instruments, Task autonomous staplers, Advanced energy  
Very few changes in scaling and movement and articulation  
Few changes in visualization:  
Improved stability but questionable need for force feedback/Haptics

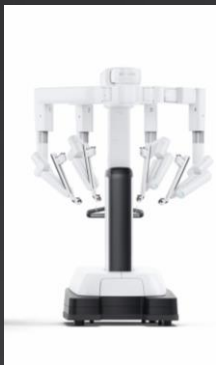
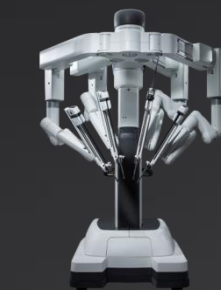
Cameras from 12 mm to 8 mm, no articulating cameras except with SP

Instruments from 8 mm to 5 mm and back to 8 mm

Mediocre ergonomics

Very few digital analysis tools

Slower times with basic cases compared to laparoscopy at higher cost



# High Performance Robotics?

Culture of converting  
open surgery to  
laparoscopy with robotics

Raising the Floor:  
Recruiting surgeons to  
robotics

Not Always Raising the  
Ceiling: Making good  
robotic surgeons better



# Doesn't the 5 take us to the Next Level??



These decisions are made in an environment of constant risk mitigation to prevent losing what's been gained.

So its more about careful growth than taking risk when in a monopolized space

Haptic Feedback-another recruitment tool? I feel with my vision now.

Improved Ergonomics: Finally but still not enough and way late

More Integrated and Efficient:  
Basic level insufflation- no heated humidified, no continuous flow  
Entry camera-oh yeah, not integrated.  
In console moves- Yay, oh wait I can't practice them because the simulator modules aren't out

Modern High Level Processing Power-Great, and what's that doing now? Little so far

# True High Performance Robotics

Eliminate the carts

Truly integrate laparoscopy and robotics

Faster scaling

Rotational scaling

Faster instrument exchanges

Right size the tech for the procedure

Flexible cameras

More port position options and arms

More multiuse instruments

Combined endolumenal and laparoscopy at one console

Integrated sealing and stapling that supports the latest best in class devices

Telesurgery



# What's the Potential FDA Robotic Clearance Trial Process?

Possible General Indications for General and Abdominal Surgery

- \* Upper Abdominal Procedures: representative complexity is roux en Y gastric bypass
- \* Lower Abdominal Procedures: representative complexity is low anterior resection
- \* General Abdominal Wall Procedures: inguinal and ventral hernia

Each Company Develops its Individual Plan for Clearance

Specific Indications for General Surgery?

Post Market submission of collected case data outcomes

~10 FDA submitted systems in the pipeline with clearances in Intuitive, CMR, Distalmotion, Moon and more likely soon

# Modular Cart Arms



### THE TOWER

Designed to be:

- Universal (RAS and lap)
- Upgradeable

### THE SURGEON CONSOLE

- Open design
- 3D HD visualization

### ROBOTIC END EFFECTORS

- Medtronic expertise

### THE ROBOTIC ARM CART

Designed for:

- Mobility
- Flexible use

Investigational device currently under development. Not cleared or approved for sale in U.S. or any market.



3DHD Laparoscope with  
Fluorescence Imaging



Modular Surgical Robot with  
Immersive Surgeon Console

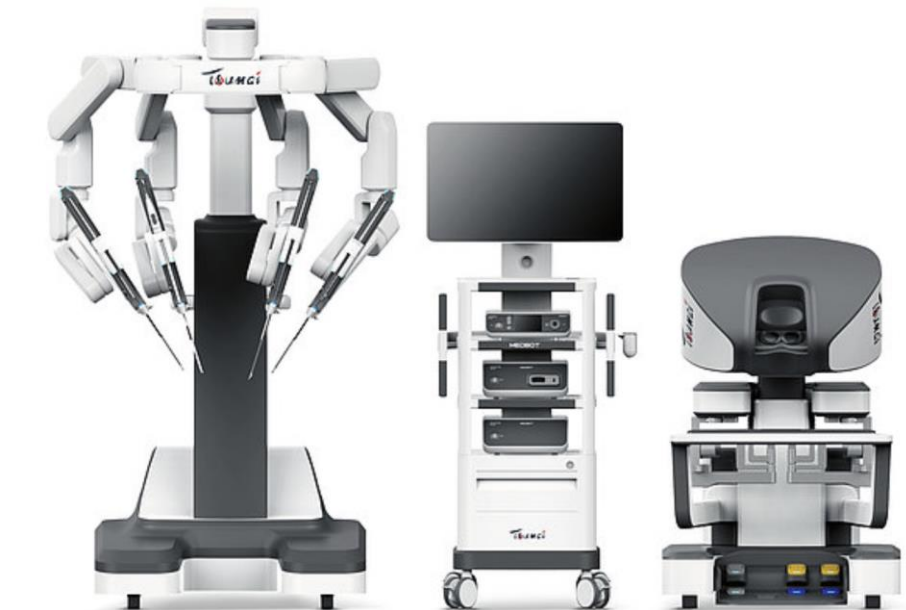


Comprehensive Instrument Offering  
Advanced Instrument-Ready

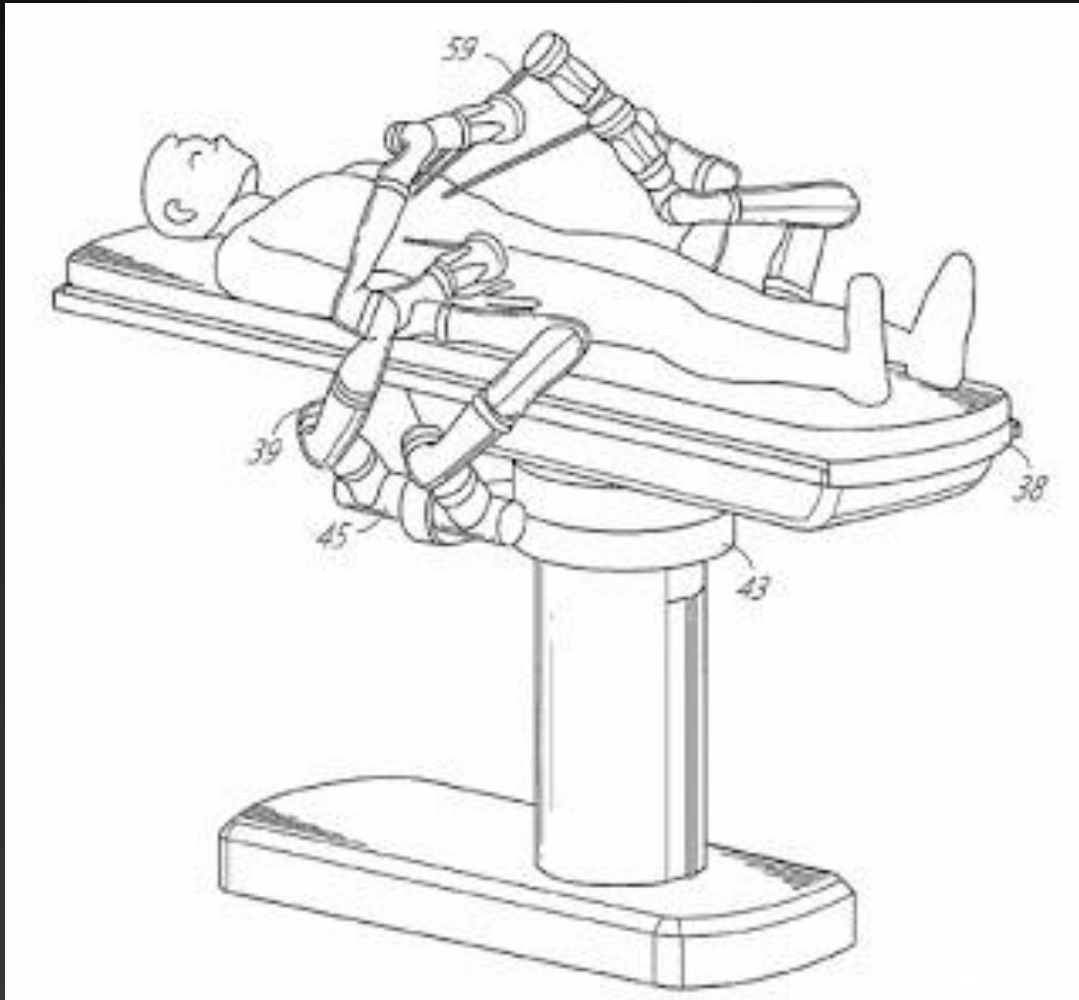
RONOVO SURGICAL | CONFIDENTIAL



# Boom Mounted Arms



# Table Integrated Arms: Modular Access Points without the Carts



- I have been part of the OTTAVA program since its inception.
- I have seen how the team has incorporated feedback from myself and other surgeons into the current system and the roadmap for what's ahead.
- What most surgeons will comment on is the architecture – the arms stowed underneath the bed until deployed.
- I believe that this hasn't been done before because it's difficult...so it's pretty exciting to see it on OTTAVA.

# First Clinical Cases with Ottawa

Surgeon: Dr. Erik Wilson (2025)

Procedure: Roux-en-Y Gastric Bypass

Significance:

- First human use of Ottawa in bariatric surgery
- Intended to safety/efficacy in complex anatomy
- FDA Novo Pathway

\* Table-Integrated Architecture

• Core Innovation: 4 arms deploy from OR table base (not carts/booms)

• Unique Advantages:

- OR space reduction vs. boom or cart systems
- Potential for improved access across the surgical field
- Combined integrated movement of table and arms
- Long track record of high functioning advanced instrumentation

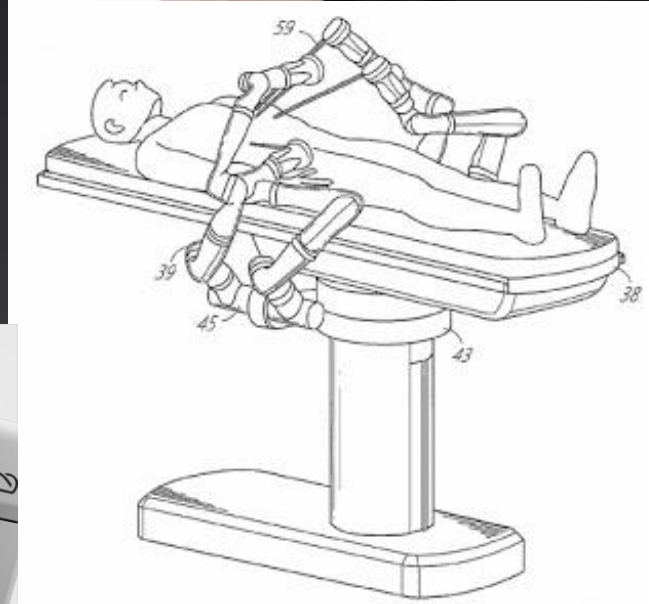
# Innovation surrounds a robotic system



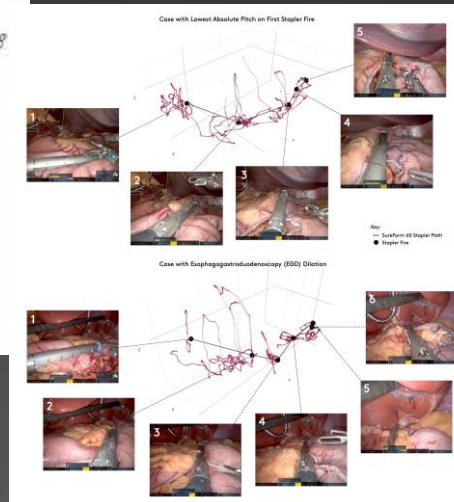
## Connected innovation and technology

- Advanced visualization
- Connected devices
- Instruments
- Imaging
- Pre- and post-op solutions
- AI & Digital

DUALTO™ Energy System User Interface



ETHICON™ 4000 Stapler & ETHICON™ 3D Reloads



# Creating an Open Ecosystem

Consistency of experience in open, lap, and robotic surgery with  
Ottava

Creating the open digital ecosystem for surgery:

Polyphonic

- **Open to any digital solution – so that surgeons have access to innovation with a streamlined experience.**
- **Open data sharing – to help with benchmarking and identifying best practices.**
- **Open to algorithms – so that surgeons have tools to help create and scale AI solutions into other ORs.**

# What's Next?

IDE in place with plan for complete trial and submission for De Novo authorization in the United States

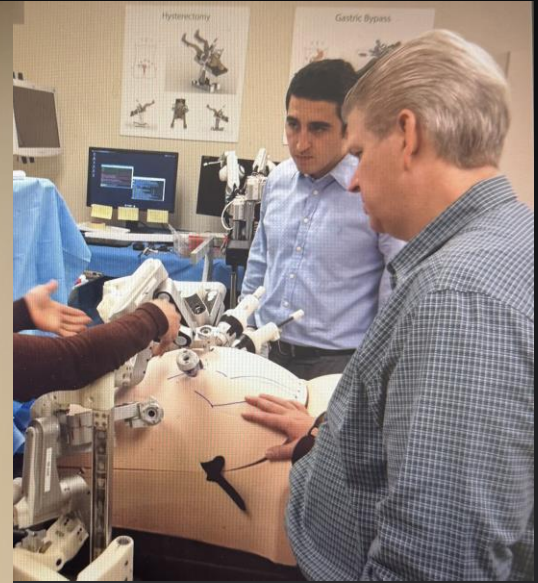
- \* Target initial indications covering multiple procedures in general surgery within the upper abdomen
- \* With clearances then commercialization in the United States.
- \* This is a global program and parallel path regulatory submissions in key markets outside of the U.S.

# Robotics Hype vs Reality

Robotics makes surgery better more most surgeons but not every surgeon, it raises the floor and raises surgical skill set in difficult situations but its time to make every surgeon better, safer and more efficient.

- \* The last 25 years robots hasn't changed dramatically in its form and function—Until NOW
- \* The drive to more minimally invasive with smaller and fewer access points and endolumenal will be led by robotic platforms—combined approaches (CELS)
- \* General use vs Task specific vs specialty specific vs procedure specific digital platforms are all being developed. If you truly want to improve cost and value, then we need to support these developments. Engage and make everyone better for our patients.
- \* Ergonomics and efficiency is something the next generation of surgeons seriously care about and our digital platforms need to seriously embrace this.

# Thank You to the Whole Team!



# Thank You to the Whole Team!



- \* It's a computer between us and the patient: That has always been a very powerful long term value proposition to justify robotic platforms and this hard work
- \* Please engage with us to make surgery better