Robotic Surgery and Advancements in Iran

Alireza Mirbagheri

Associate Professor, Department of Medical Physics and Biomedical Engineering, School of Medicine

&

Director of Iran Advanced Clinical Training (i ACT) center

Tehran University of Medical Sciences, Tehran, Iran

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What is the problem?

- None ergonomic position
- High fatigue

- Large incision
- Poor accuracy
- Hand tremors
- Infections

What is the solution?

Robotic Abdominal Telesurgery systems

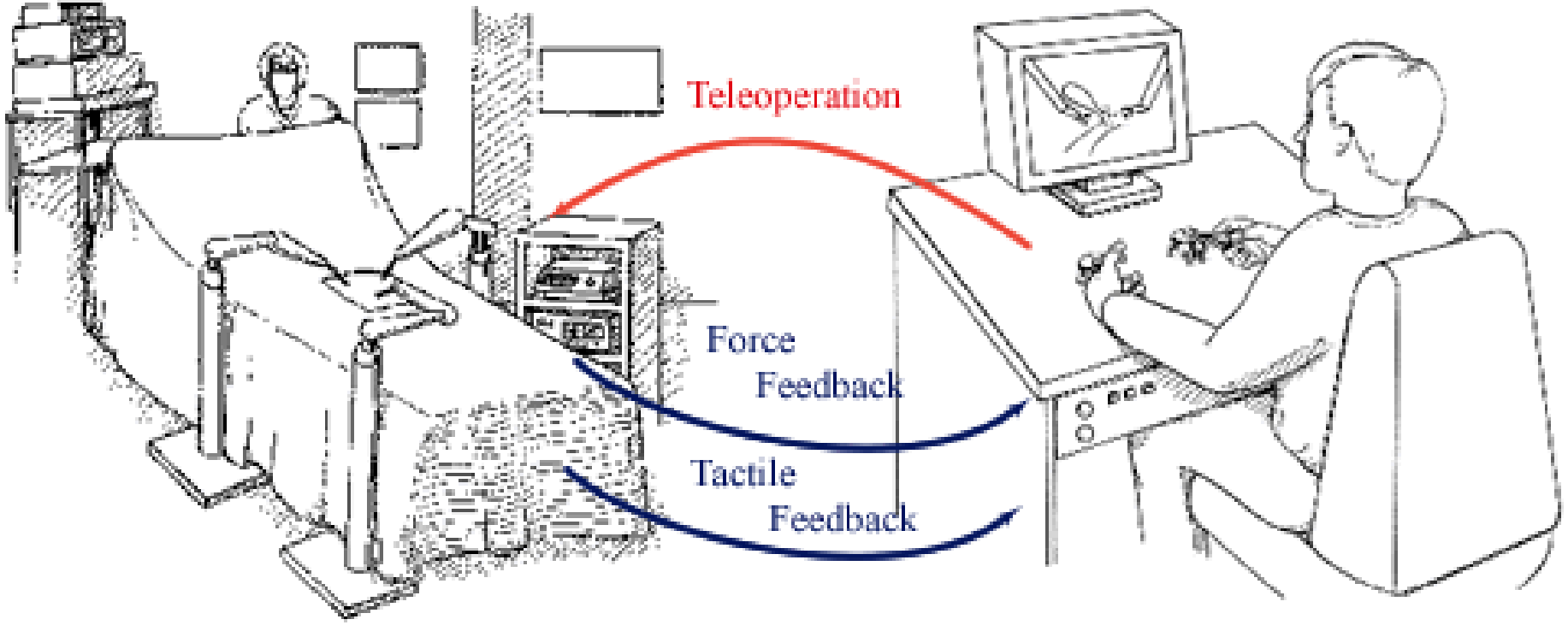
Reference: Springer Handbook of Robotics, Siciliano, Khatib, 2008

Why and How?

	Strengths	Limitations
Humans	Excellent judgment	Prone to fatigue and inattention
	Excellent hand–eye coordination	Limited fine motion control due to tremor
	Excellent dexterity (at natural *human* scale)	Limited manipulation ability and dexterity outside natural scale
	Able to integrate and act on multiple information sources	Cannot see through tissue
	Easily trained	Bulky end-effectors (hands)
	Versatile and able to improvise	Limited geometric accuracy
		Hard to keep sterile
		Affected by radiation, infection
Robots	Excellent geometric accuracy	Poor judgment
	Untiring and stable	Hard to adapt to new situations
	Immune to ionizing radiation	Limited dexterity
	Can be designed to operate at many different scales of motion and payload	Limited hand–eye coordination
		Limited haptic sensing (today)
		Limited ability to integrate and interpret complex information
	Able to integrate multiple sources of numerical and sensor data	

Reference: Springer Handbook of Robotics, Siciliano, Khatib, 2008

Solution: Robotic Abdominal Telesurgery systems

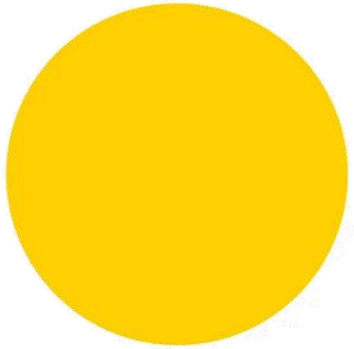


Market & demands (Past, Now & Future)

Open Surgery 100%

Laparoscopic Surgery 0%

Robotic Surgery 0%



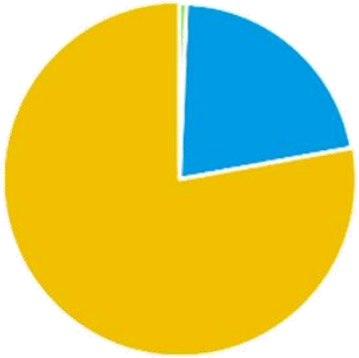
1980

Open Surgery 77%

Laparoscopic Surgery 22%

Robotic Surgery 1%

Robotic Started



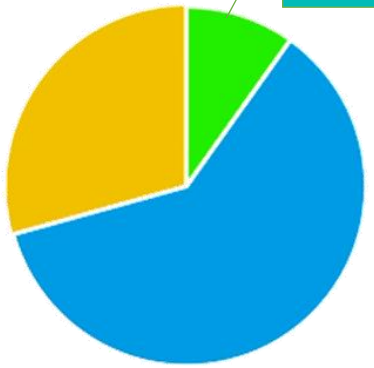
2002

Open Surgery 29%

Laparoscopic Surgery 61%

Robotic Surgery 10%

5 B$



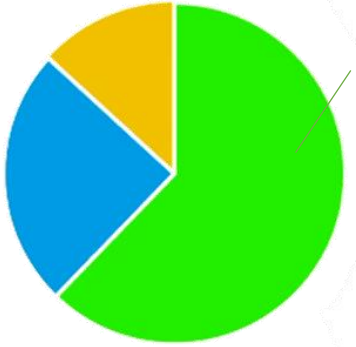
2020

Open Surgery 13%

Laparoscopic Surgery 25%

Robotic Surgery 62%

137 B$



2040

* Source: Data Bridge Market Research report 2017 and 2021, CAGR 17.9%

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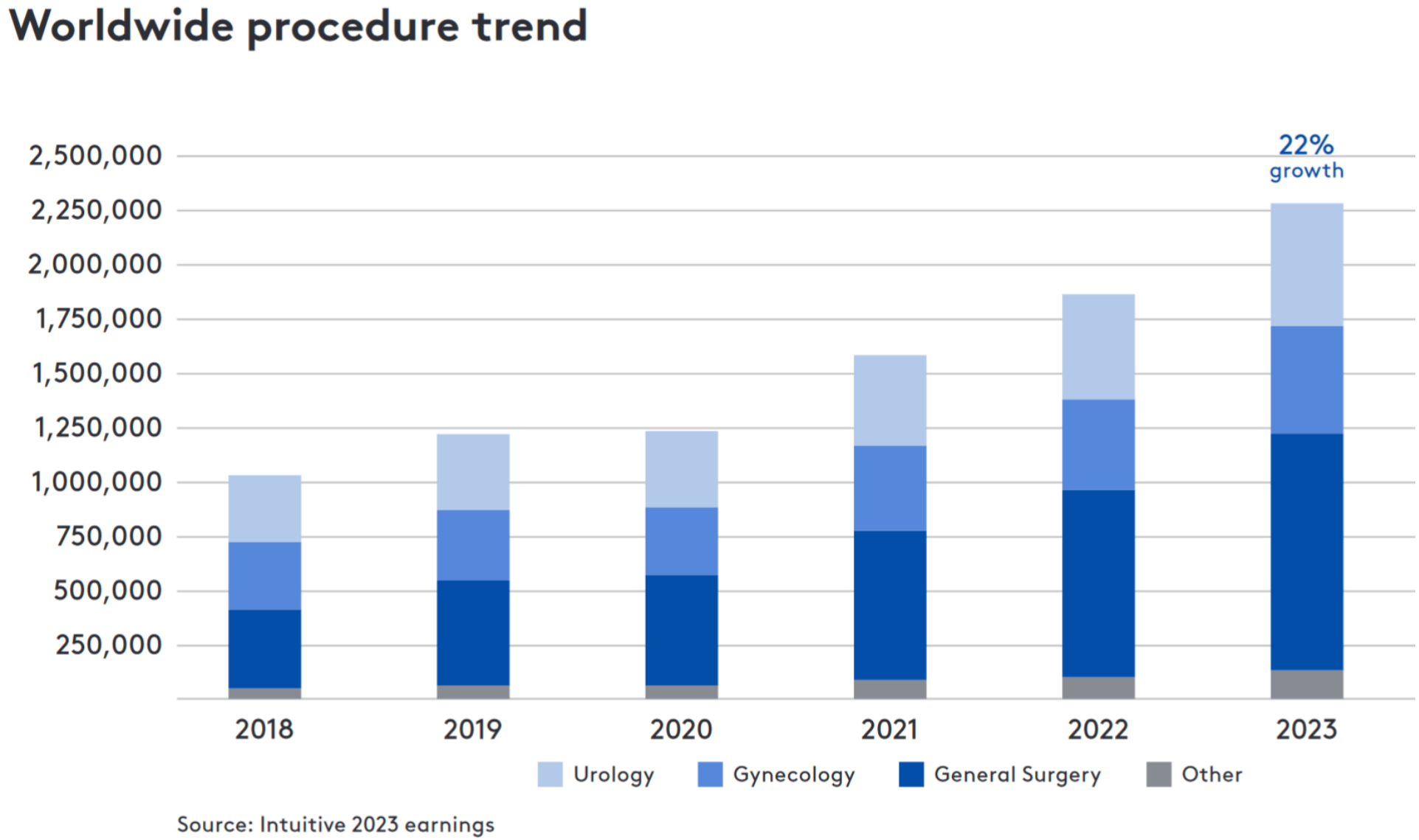
Market & demands: CAGR 22~24%



Part 1:
Company Overview

Corporate overview

- *Sian Robotics and Medical Innovators (SinaMed) is …*
  - *A medical robotics 100% private company*
  - *Spinoff from Tehran Uni. of Med. Scie. & Sharif Uni. of Tech.*
  - *Founded at 2015 after 15 years of R&D at the field of medical robotics*
  - *Over 50 Graduate and Post Graduate R&D Staff*
  - *The Board of directors of SinaMed includes:*

Prof. Saeed Sarkar
PhD in Medical Physics
from University of Surry,
Surry, United Kingdom

Prof. Fazam Farahmand
PhD in Biomechanics
from Imperial College,
London, United Kingdom

Dr. Alireza Mirbagheri
PhD in Mechanical Eng.
from Sharif University of
Technology, Tehran, Iran

Specialized Researcher and Staff

More than 50 Graduate and Post Graduate Staff

Ph.D. (33%)

M.Sc. (46%)

B.Sc. (21%)

Expertise in: Mechanical and Industrial Design, Mechatronics, Robotics, Manufacturing, Biomedical Engineering, Electronics, Image Processing, Software, etc.

Milestones of more than 20 years of R&D

(Since 2003)

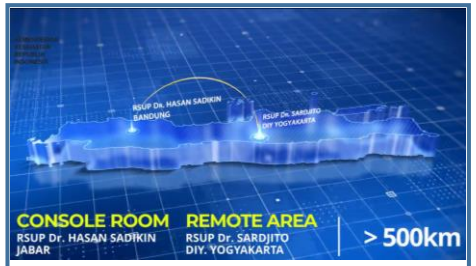
1st human trial of RoboLens

RoboLens 1000th human trials

SINA 2nd prototype

SINA (Straight) 1st animal trial

SINA (Flex)



Over 500 km Telesurgery in Indonesia

2003 | 2005 | 2007 | 2009 | 2011 | 2013 | 2015 | 2017 | 2019 | 2021 | 2023

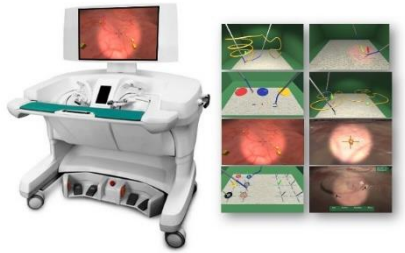
Robotic Surgery Lab. establish ment

RoboLens 2nd generation

SINA 1st prototype

SINA (Straight)

SINA Simulators



SINA
Telesurgery

Iran

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Products Overview

Robotic Surgery

Sina flex

Sina Straight

RoboLens Bedside

RoboLens Standalone

Robotic Rehabilitation

Hand Robo Hab

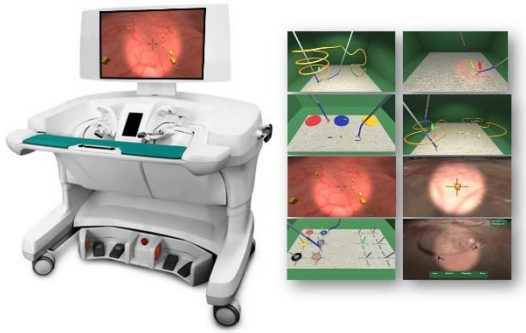
Wrist Robo Hab

Ro Mo

Robo Assist

Medical Simulators

Sina Robo Sim



Sina Lap Sim

Sina LP Sim

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Part 2:
Expansion plan on:

Solution: Sina Robotic Telesurgery System

Surgery robots

Local connection / Internet

Surgeon's console

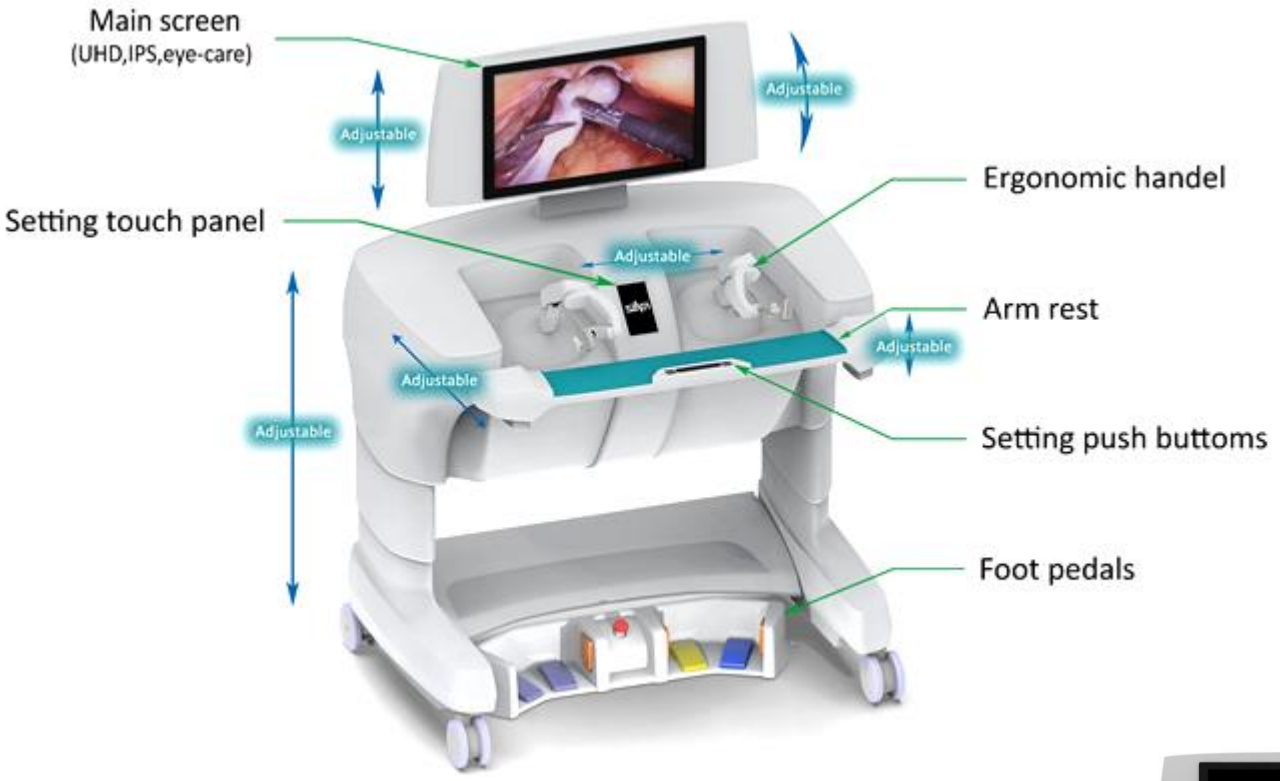
Sina flex Video

Surgeon's Console

Unique values:

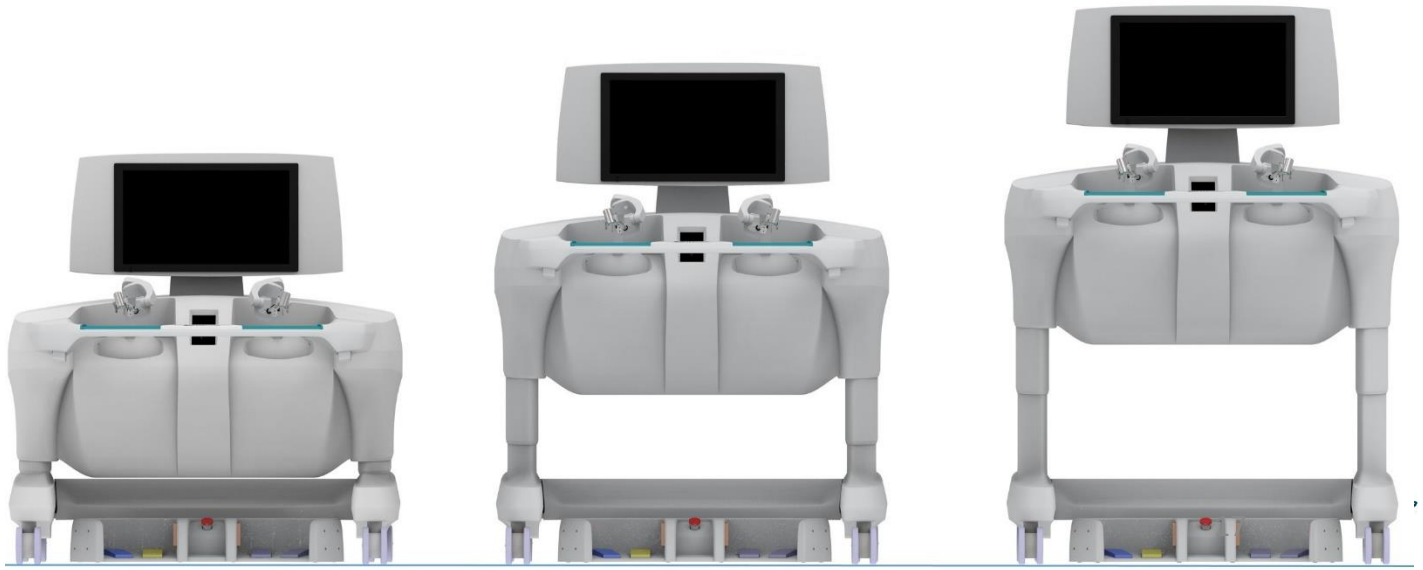
- *Optional Handle, like open surgeries, in the form of scissor and stylus*
- *Force feedback (Haptic)*
- *2D/3D/Flexible view (optional)*

Surgeon's Console



Unique values:

- ***Ergonomic Sitting and standing postures***



Cameraman robot

Unique values:

- *Non-interruptive Repositioning of Surgical Bed*
- *Design for high maintenance free operation period and low cost services*

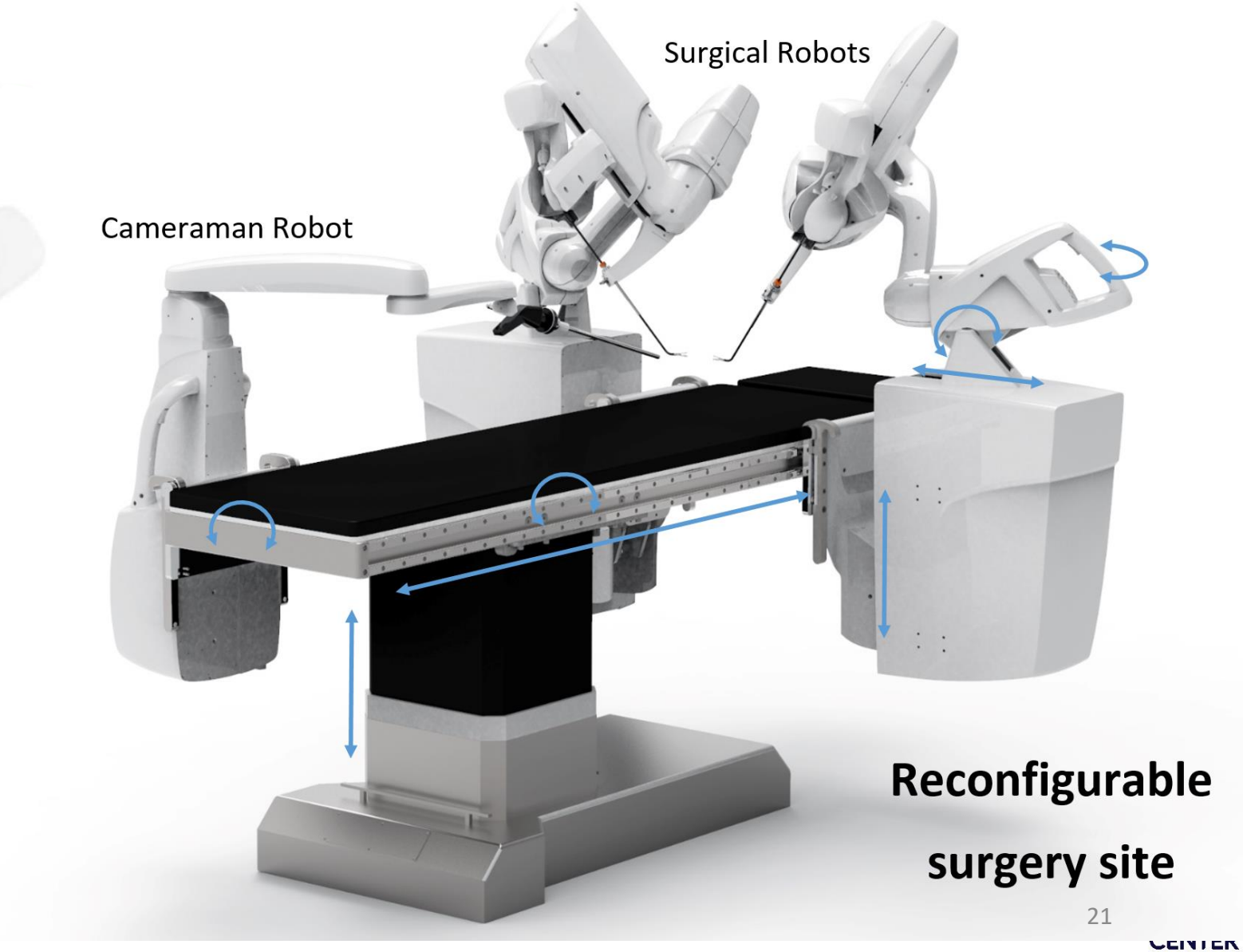
Cameraman robot

Surgery robots

Unique values:

- *Modular and flexible design for robot placements (3 to 4 arms)*
- *Using previously available equipment of OR- reduced the hospital cost for entering to the new technology of robotic surgery*

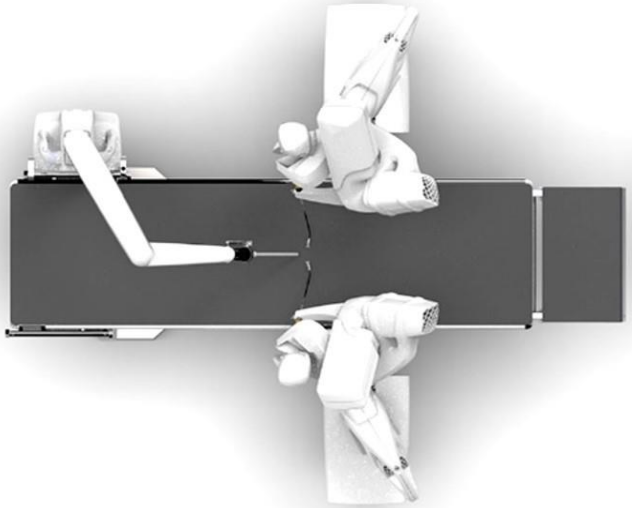
Surgery robots

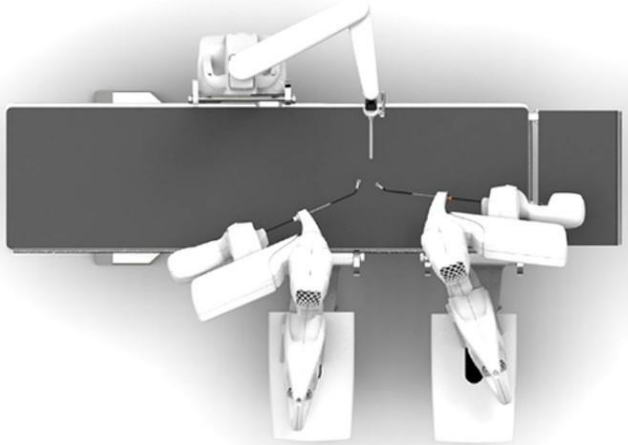


Reconfigurable surgery site

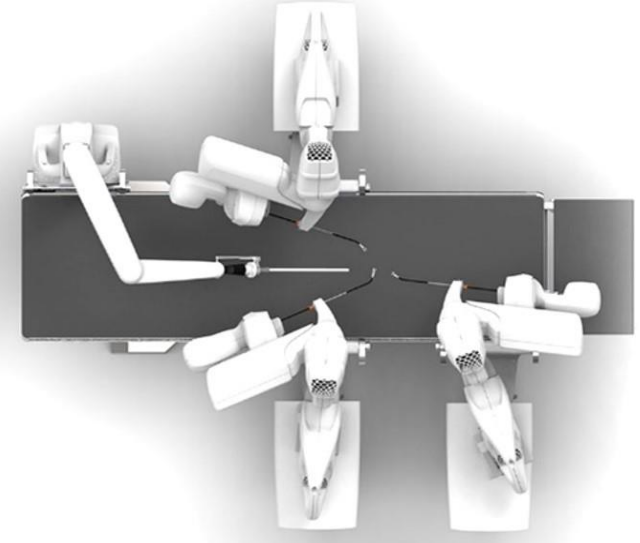
Surgery robots

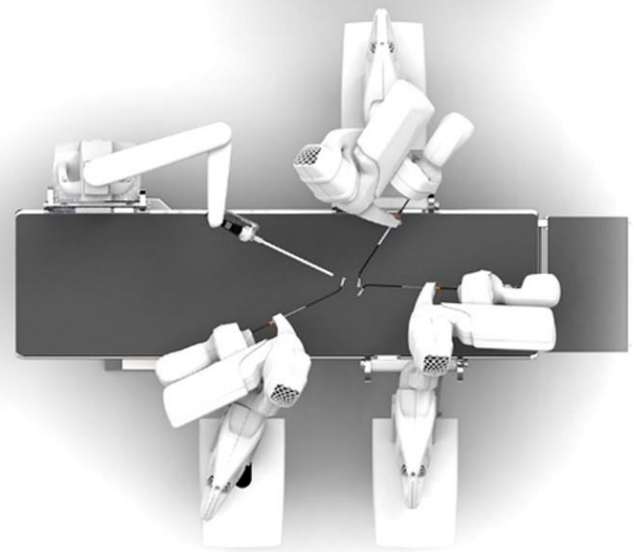
3 arms configuration samples



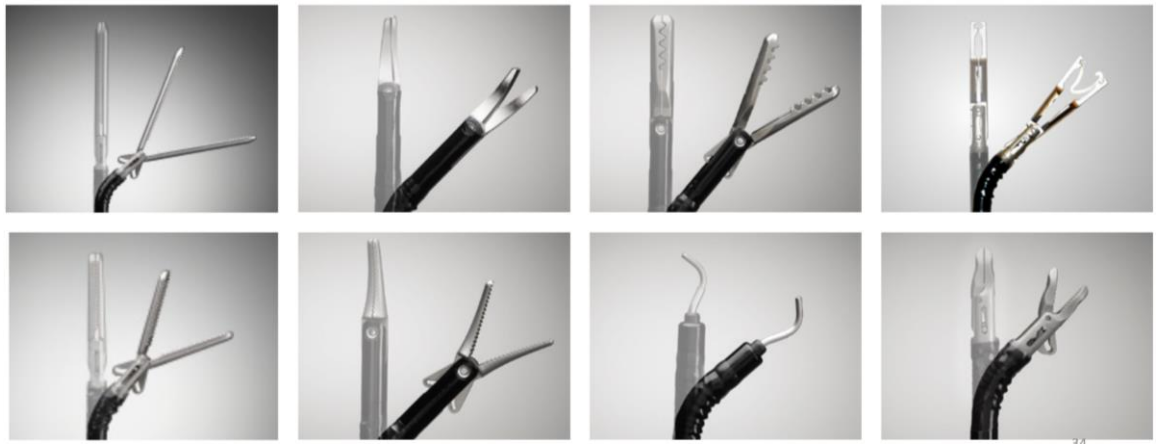


4 arms configuration samples





Instruments

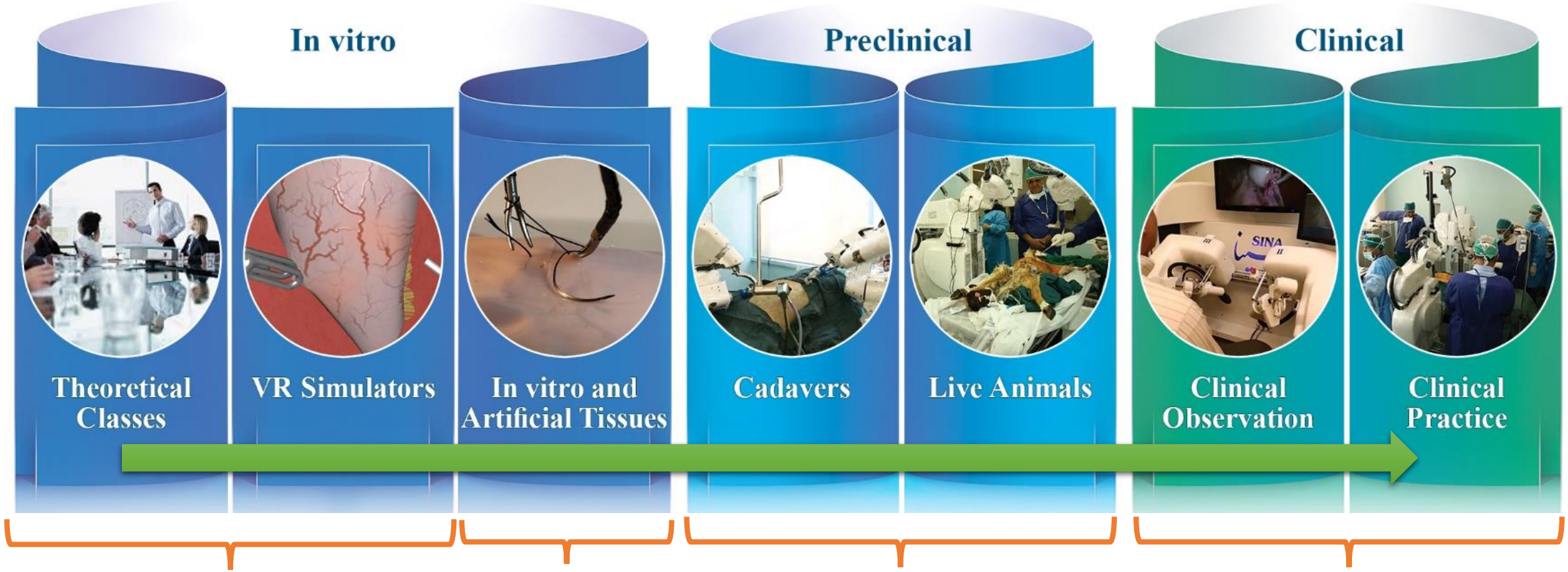


Unique values:

- *Reusable & disposable low cost straight instruments for simple surgeries to reduce the robotic surgery cost, same as conventional manual one*
- *Flexible & low cost disposable instruments to reduce the robotic surgery cost of advanced surgeries, near to conventional manual one*

Iran Advanced Clinical Training (i ACT) center

Training program overview



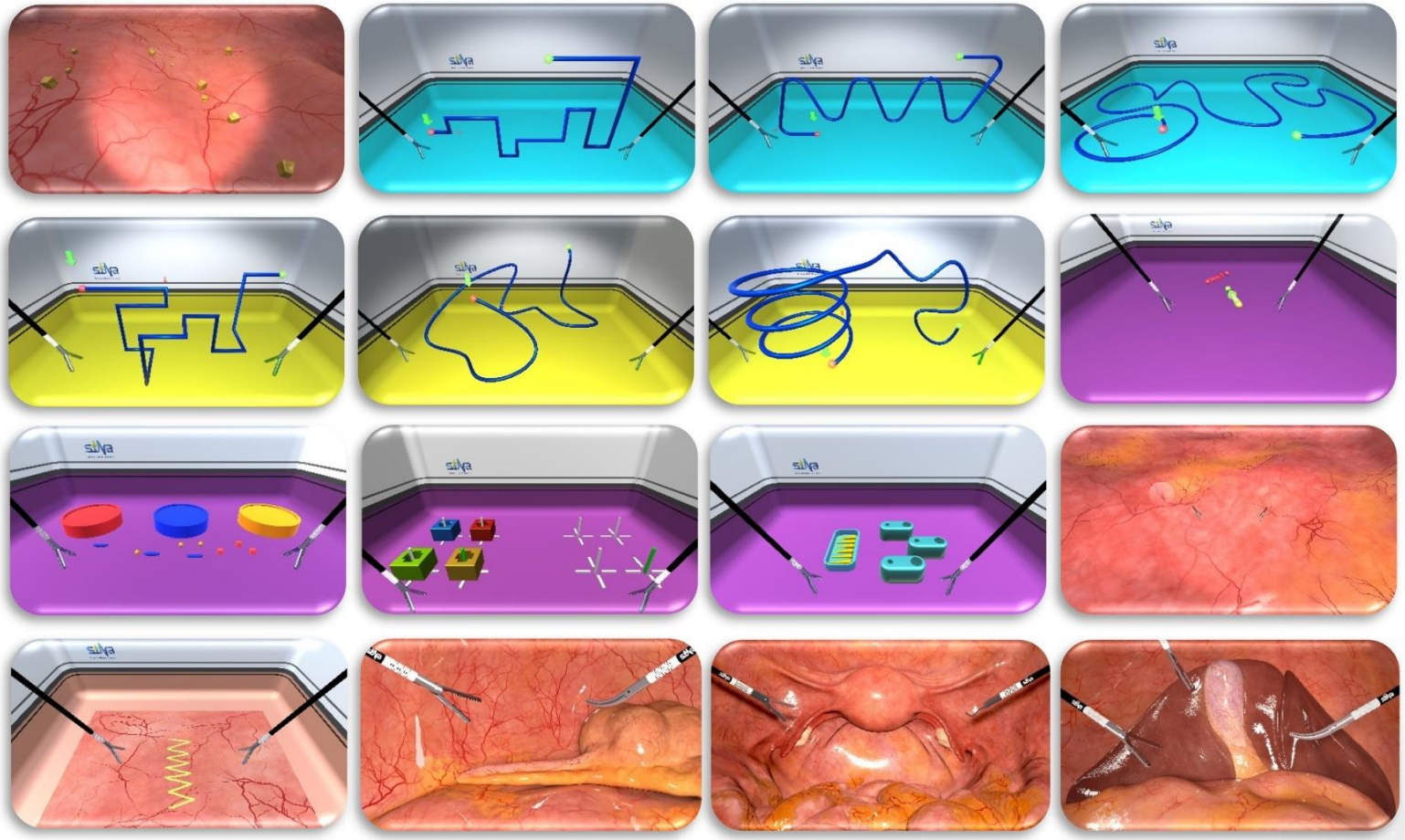
1st Phase

2nd Phase

3rd Phase

4th Phase

Robotic Surgery Simulator



Achievements

International Standards and Certificates

- ✓ GMP
- ✓ ISO 13485: 2016
- ✓ ISO 9001: 2015
- ✓ IEC 60601-1
- ✓ IEC 60601-1-2
- ✓ IEC 60601-1-8
- ✓ IEC 60601-2-2
- ✓ IEC 60601-1-6
- ✓ IEC 62366
- ✓ IEC 62304
- ✓ IEC 60601-2-46
- ✓ ISO 10993-5
- ✓ ISO 10993-10
- ✓ ISO 10993-10


INSTITUTE OF GLOBAL CERTIFICATION

Institute of Global Certification

IGC

Management System Certification Body No. MSCB-105

CERTIFICATE

No. 21-A-3642 Rev. 0

Sina Robotics and Medical Innovators Co., Ltd.

Unit No. 9, Incubation Center for Medical Equipment and Devices of Tehran University of Medical Sciences, North East Corner of Imam Khomeini Hospital Complex, Bagher Khan Ave., Tehran, Iran

Company Reg. No.: 475044

has documented and implemented system in compliance with the requirements of

ISO 9001:2015
Quality Management System

for

Design and Manufacturing of Robotic Tele-surgery System and Laparoscopic Surgery Simulator

IAF Code: 19, 23

The certificate is issued on the basis of the results mentioned in the pertinent audit report. Validity of the certificate is conditionally limited by positive results of surveillance audits, which the certified company is committed to undergo.

This certificate can be invalid if the certificate holder does not fulfill the conditions set out in the certification agreement.

IGC is accredited by IAS for the scope and sub scopes described in this certificate

Initial issue date: Oct. 01. 2021
Expire date: Sep. 30. 2024

G. Gilbert
G.Gilbert
Head of Certification Body

IGC ISO 9001 CERTIFIED

Rm. 501, Daeryung techno town, 638, Seobusaet-gil, Geumcheon-gu, Seoul, Republic of Korea
www.igcert.org


INSTITUTE OF GLOBAL CERTIFICATION

Institute of Global Certification

IGC

Management System Certification Body

CERTIFICATE

No. 21-GMP-0035 Rev.0

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Good Manufacturing Practices Requirements

for

Design and Manufacturing of Robotic Tele-surgery System and Laparoscopic Surgery Simulator

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Institute of Global Certification

IGC

Management System Certification Body No. MSCB-105

CERTIFICATE

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Company Reg. No.: 475044

has documented and implemented system in compliance with the requirements of

ISO 13485:2016
Medical Devices Quality Management System

for

Design and Manufacturing of Robotic Tele-surgery System and Laparoscopic Surgery Simulator

Technical Area: TA 06

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Head of Certification Body

IGC ISO 13485 CERTIFIED

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www.igcert.org

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Intellectual Properties & Achievements

- ✓ 20 national patents
- ✓ 10 international patents (PCT, USA, China, in progress)
- ✓ 1st choice of Khwarizmi award 2012
- ✓ 1st choice of Sheikh Bahayee award 2013

Achievements

1st choice of China Intellectual Property

Innovation and Entrepreneurship Contest, IPIEC Global 2017

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Achievements

✓ *1st choice of Iran high-tech projects for investment 2019*

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Agreements

Sina_RTC agreement for SKD production of Sina flex at Saint Petersburg 2019

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Agreements

PILOT PROJECT INDONESIA-IRAN 2020-2023

Health Cooperation on Robotic Surgery

G to G collaboration on Pilot Project of Joint Investment and Transfer Technology of Robotic Surgery advanced technology medical devices for local production and robotic skill surgery training center for specialist doctors and residences.

MULTIDIMENSIONAL STAKEHOLDERS ROLE:

1st: **Hospital** conducting a training program for specialist doctors, for transfer of knowledge & skill of Robotic Surgery.

2nd: **University** joint research hospital based of clinical trial stage 3 of the Robotic Surgery.

3rd: **Industries** develop a feasibility study of business partnership joint investment and transfer technology for local production of the Robotic Surgery in Indonesia.

4th: **MoH RI** supporting Vertical Hospitals establishing the training center with the Demo machine, supporting the SAS scheme of the devices and developing policy recommendation for National Health Insurance System.

Iran_ Indonesia program for Cooperation on Joint investment and Technology Transfer of Robotic Surgery Technology 2020-2023

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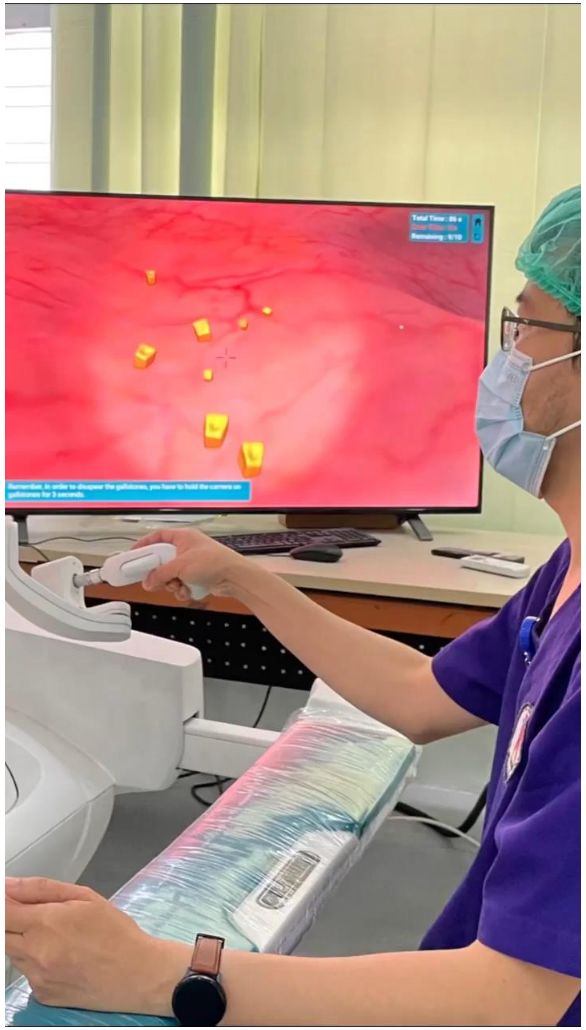
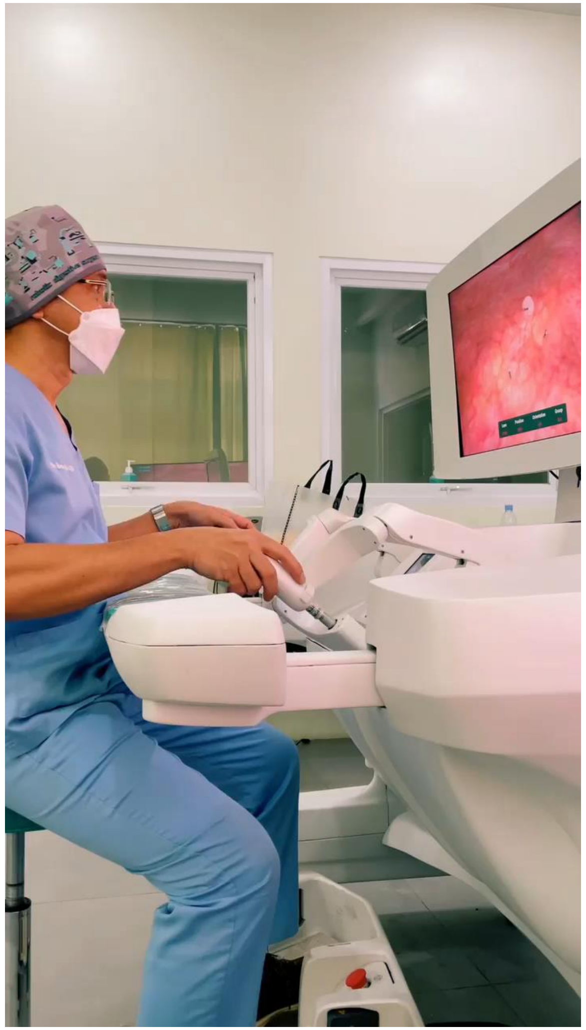
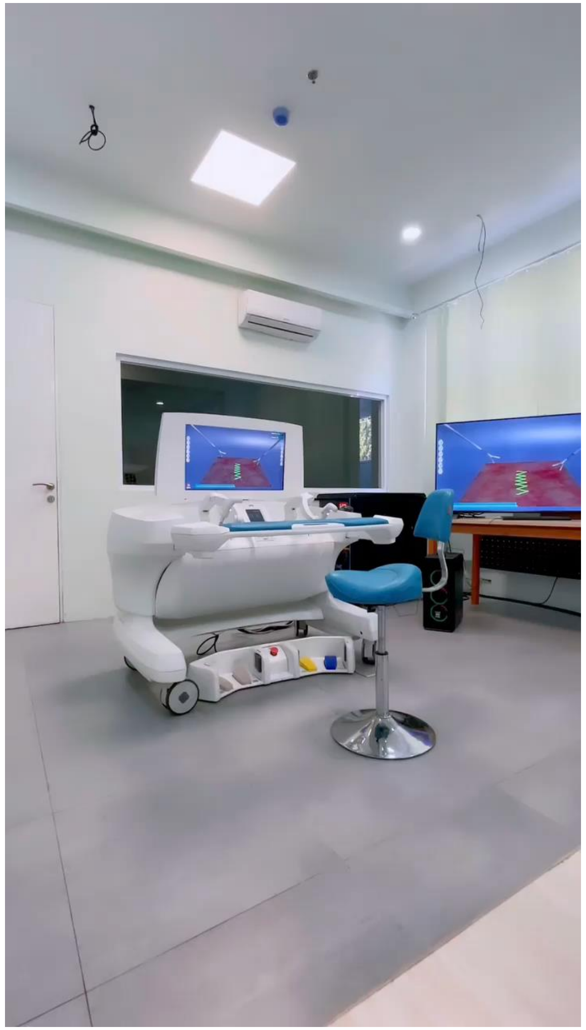
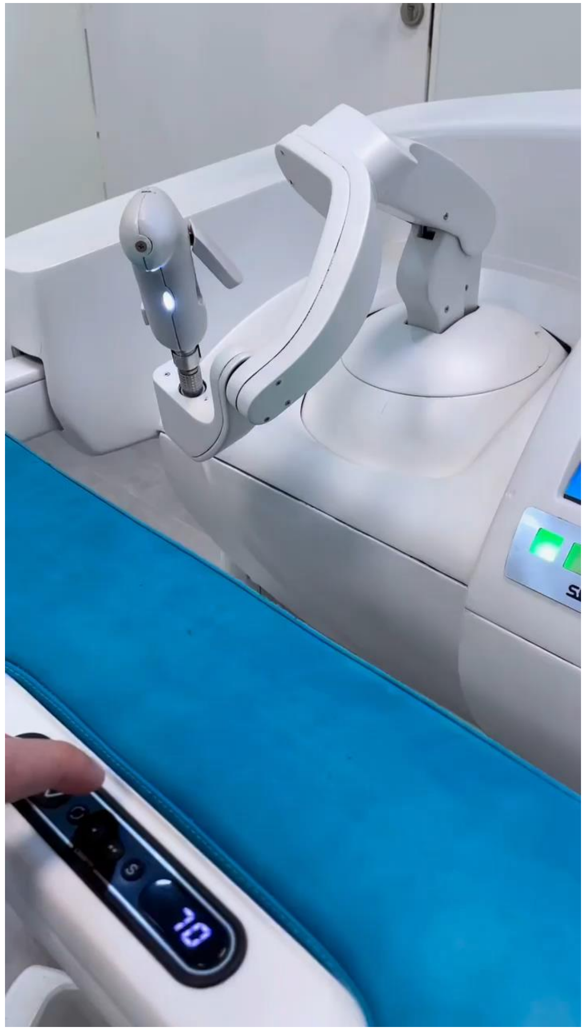
Indonesia Training Department







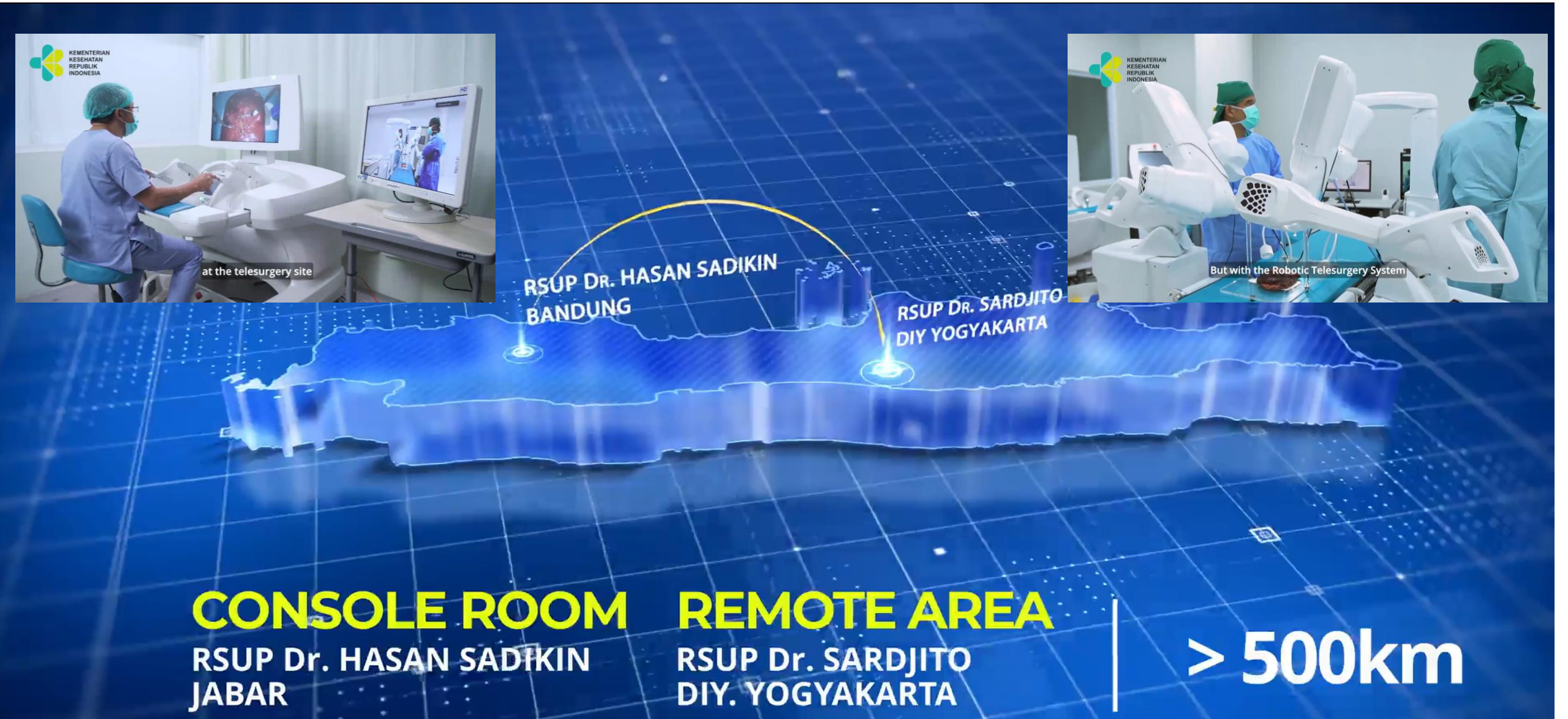


Agreements

Establishment of 1st Robotic Telesurgery Training Center at Indonesia

Indonesia-Iran Robotic Tele-Surgery Training Center (Yogyakarta- Feb. 2023)

1st Demo of Tele-Surgery over Indonesia between Bandung and Yogyakarta, May 2023



International Collaboration

Thank you for your attention

www.iACTcenter.ir
Tel: 0098 21 66907532
Email: iACT.amtei@tuma.ac.ir


SiNA