

# **Revolutionizing Surgery**

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**Revolutionizing Surgery : India Leads the Way in Robotic Telesurgeries with SSI Mantra** 

#### **Context:**

India has reached a major milestone in healthcare technology with the successful completion of **robotic telesurgeries** using **SSI Mantra**, an indigenous robotic system. This advanced technology allows **remote surgery** with minimal delay, achieving an incredible **latency of just 40 milliseconds**. With telesurgery, **surgeons can perform surgeries from anywhere** using robots and high-speed data connections, which is a significant breakthrough in medical technology.

## About SSI Mantra: India's Indigenous Surgical Robotic System

#### • What is SSI Mantra?

- SSI Mantra is an advanced surgical robotic system created by SS Innovations to perform complex surgeries, including telesurgeries.
- First in the world: It is the only robotic system globally to be approved for telesurgery and tele-proctoring by India's Central Drugs Standard Control Organization (CDSCO).

## • Key Features of SSI Mantra:

- Ultra-low latency: It has an amazing speed of 35-40 milliseconds, making it
  possible to perform surgeries remotely without delay.
- It is capable of performing high-precision surgeries, including Totally Endoscopic Coronary Artery Bypass (TECAB), one of the most complex cardiac surgeries.
- Regulatory approval: SSI Mantra is the first robotic system to receive official approval for telesurgery and tele-proctoring.

## How It Works:

- Remote control: Robotic arms are controlled remotely by surgeons over a secure, high-speed network.
- Real-time operations: This technology allows for precise and accurate remote surgeries with little to no delay.
- It also supports **tele-proctoring**, where experienced surgeons can **mentor** other surgeons remotely during surgeries.

## Global Significance and Benefits of SSI Mantra

## 1. Bridging Healthcare Gaps:

- Telesurgery helps provide access to expert medical care in remote or underserved areas, where specialized healthcare services may be limited.
- This innovation helps eliminate geographic barriers, making world-class surgeries available to people in distant regions.

#### 2. Better Patient Outcomes:

- By using minimally invasive techniques, surgeries result in faster recovery, fewer complications, and improved patient outcomes.
- **Remote surgeries** mean patients do not need to travel long distances, which reduces physical strain and speeds up recovery.

## 3. Impact on India's Healthcare System:

- SSI Mantra helps address **healthcare disparities**, **especially in rural areas**, where access to top-tier medical care has traditionally been challenging.
- It offers a cost-effective solution for improving healthcare access across India.

#### 4. Global Potential:

- The remote surgery capabilities of SSI Mantra make it a scalable solution, meaning it can be adopted globally, especially in countries with limited access to skilled medical professionals.
- It also opens new doors for surgical education, allowing remote mentoring of surgeons.

# Other Key Applications of Robotics in Healthcare

Besides telesurgery, robotics is transforming various areas in healthcare, including:

## 1. Safety & Monitoring Robots:

 Telepresence robots use computer vision to monitor patients' vital signs and health conditions in real-time, helping healthcare staff keep a close watch on patients.

### 2. Robotic Prosthetics:

 Advanced robotic prosthetics (like robotic limbs and exoskeletons) are helping amputees regain mobility and functionality, improving quality of life.

#### 3. Sanitation and Disinfection Robots:

 Sanitation robots use UV-C light or hydrogen peroxide vapour to disinfect hospital rooms, helping maintain a clean and safe environment.

## 4. Medical Transportation Robots:

Medical robots are being used to deliver supplies, medications, and meals to
patients, increasing hospital efficiency and reducing the need for human intervention.

## **Challenges in Robotics for Healthcare**

While robotics offers significant benefits, there are challenges to overcome:

#### 1. High Initial Cost:

• The **cost of robotic systems** like SSI Mantra can be **expensive**, which may make it hard for some healthcare institutions to adopt.

## 2. Training and Skill Gaps:

 Operating these advanced robotic systems requires specialized skills. There is a need for training programs to ensure healthcare professionals can effectively use this technology.

#### 3. Ethical Concerns:

With remote surgeries, it's not clear who is responsible if something goes wrong.
 Accountability becomes a key concern, especially when errors happen during telesurgery.

#### 4. Patient Trust:

• Patients may have concerns about having surgery performed remotely. Gaining trust in robotic systems and remote operations is essential for widespread acceptance.

## Indian Initiatives to Promote Robotics in Healthcare

India is actively supporting robotics in healthcare through several initiatives:

## 1. National Health Policy, 2017:

• The policy emphasizes the role of **technology** in healthcare, recognizing the potential of **robotics** in improving medical services.

## 2. Draft National Strategy on Robotics (2023):

• This strategy promotes **robotics**, including in healthcare, and plans to establish a **Robotics Innovation Unit (RIU)** to drive innovation.

## 3. Artificial Intelligence & Robotics Technology Park (ARTPARK):

 Located at IISc Bengaluru, ARTPARK is dedicated to the development of AI and robotics solutions, including those aimed at improving healthcare.

## **Conclusion**

India's successful **robotic telesurgeries** using **SSI Mantra** marks a **transformative moment** in healthcare. This **indigenous technology** not only allows **remote surgeries** with high precision but also helps bridge the gap in healthcare access, particularly in **remote areas**. While **telesurgery** has the potential to **revolutionize healthcare**, addressing challenges such as **costs**, **training**, and **patient trust** will be crucial for its widespread adoption. As SSI Mantra continues to gain global recognition, it could set the standard for **remote surgery** worldwide, creating new possibilities for healthcare innovation.

