

# 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.

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### 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.

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## 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.

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## 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.
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## 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.
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## 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.
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### 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.



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