

Telesurgery and Robotics

The Future of Medicine

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Telesurgery and Robotics

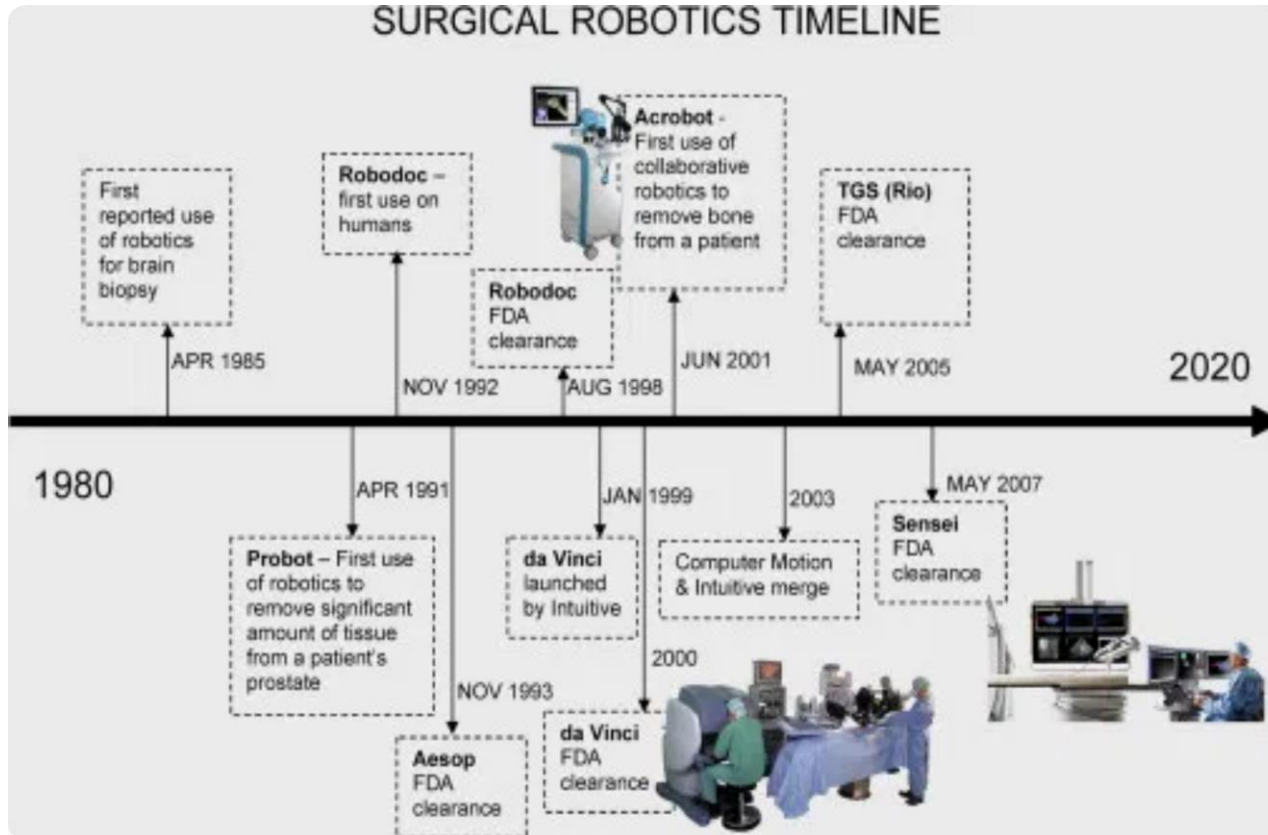
Telesurgery: A revolutionary approach combining robotics with telecommunications to perform surgery across distances

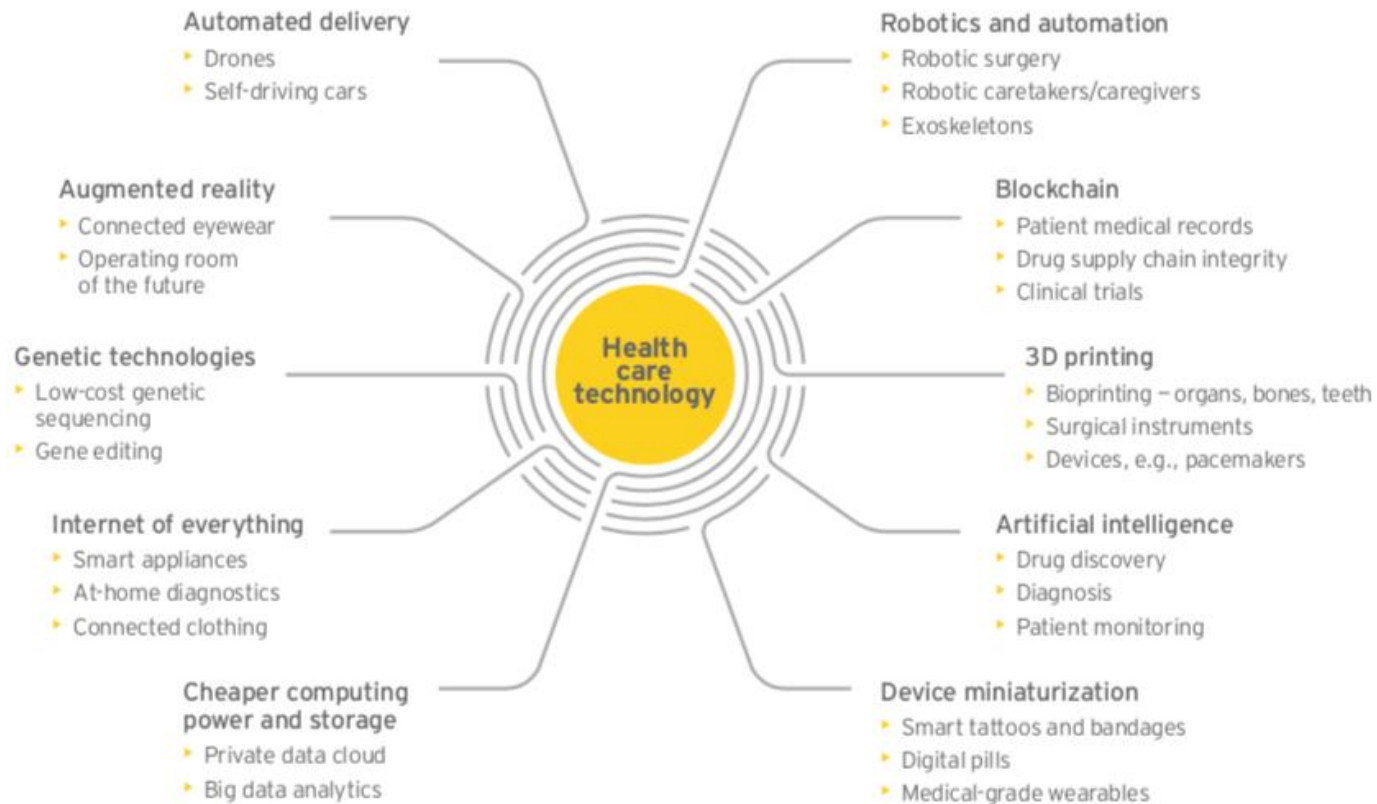
Enabling surgeons to operate on patients without being physically present in the same location

Breaking geographical barriers



The Future of Telesurgery





History and Evolution of Telesurgery

1970s-1980s: The Early Vision

Conceptual development driven by NASA and U.S. military needs for remote surgical capabilities

1992: Dawn of Robotic Surgery

Introduction of ROBODOC system for orthopedic surgery, followed by AESOP and early ZEUS systems

2001: The Lindbergh Operation

First transatlantic telesurgery - Dr. Jacques Marescaux performed cholecystectomy from New York on a patient in Strasbourg, France

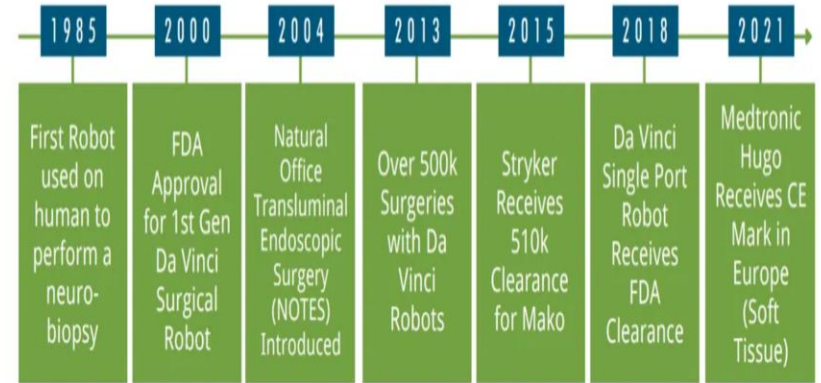
2000s-Present: da Vinci Dominance

Intuitive Surgical's da Vinci system becomes the global standard for robotic surgery

2020s: The 5G Revolution

Ultra-low latency networks enable more complex remote procedures with enhanced safety and precision

THE HISTORY OF ROBOTIC SURGERY



Core Technologies: Robotic Systems

Key Components

Patient-Side Cart:

Contains image processing equipment and displays magnified 3D view of the surgical site

Vision Cart:

Positioned next to the patient, holds robotic arms with specialized instruments and 3D camera

Wristed Instruments:

Provide greater range of motion than the human hand

3DHD Vision System:

Delivers immersive and detailed view of the surgical field

Core Technologies: Communication Networks

The Vital Link

Communication networks connect the surgeon to the patient, transmitting commands and feedback in real-time

Critical Factors

Latency: Time delay between surgeon's actions and response

Ideal: **<100 milliseconds**

Problematic: **>300 milliseconds**

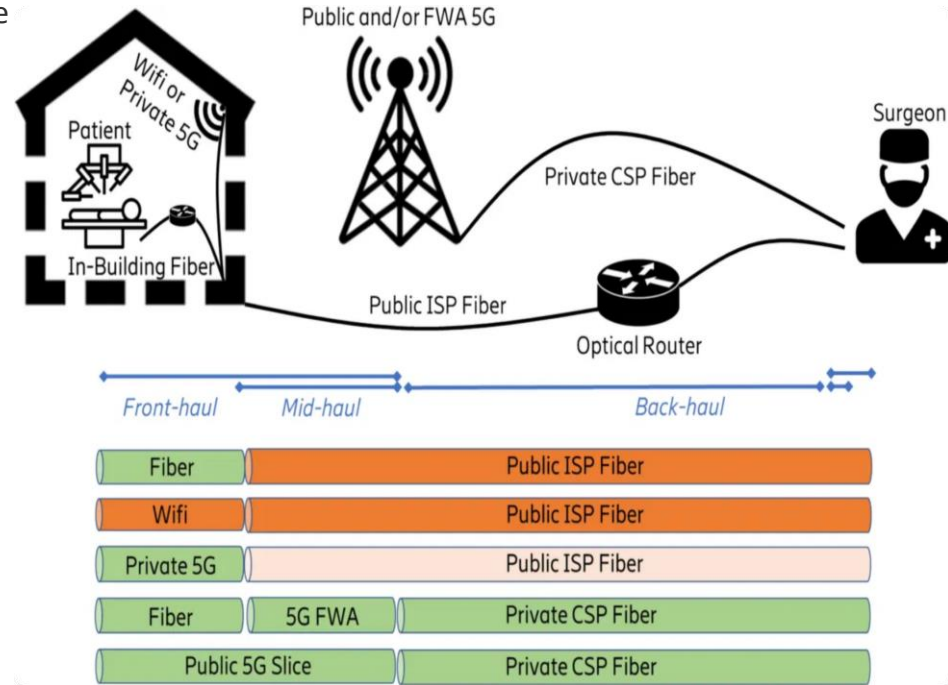
Protection against cyber threats is essential for patient safety

5G Revolution

Ultra-low latency

Enables reliable long-distance telesurgery

Future 6G networks promise even greater capabilities



Benefits and Advantages of Telesurgery



Improved Patient Outcomes with telepreceptorship



Minimally Invasive Procedures



Enhanced Surgical Precision



Greater Access to Specialized Care

Bringing world-class surgical expertise to remote and underserved areas



Reduced Surgeon Fatigue

Ergonomic console design reduces fatigue during long and complex procedures



Challenges and Limitations

🕒 Latency Issues

Ideal latency: below 100ms; acceptable: up to 320ms

Critical factor for safety and effectiveness

🛡️ Security Concerns

Protection against hacking and cyber threats

Patient data protection and privacy

💰 Cost Barriers

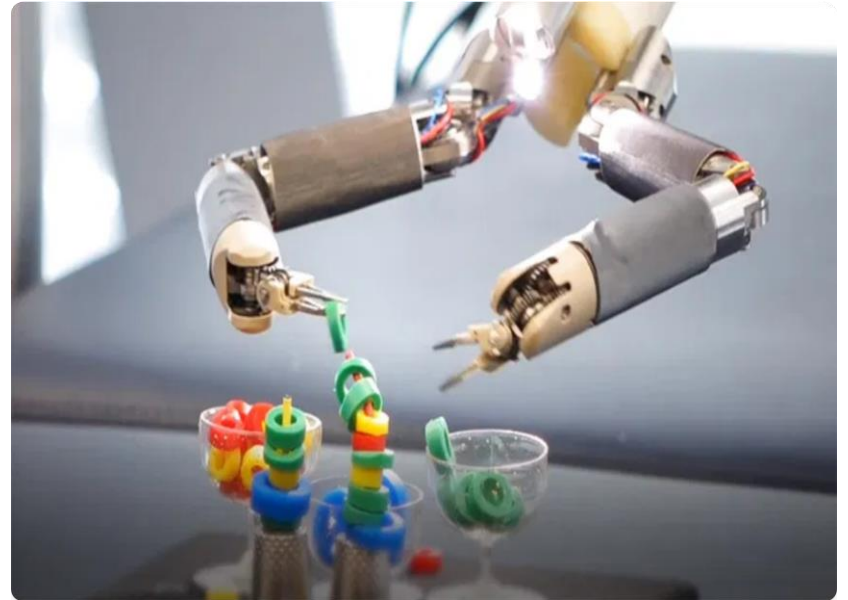
High equipment acquisition and maintenance costs

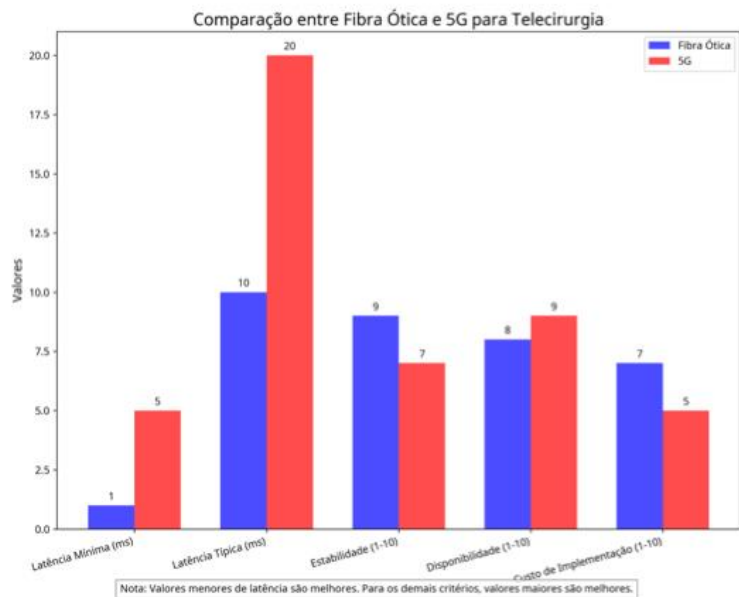
Specialized infrastructure requirements

🔗 Ethical and Legal Issues

Cross-border licensing and credentialing

Liability in case of system malfunction



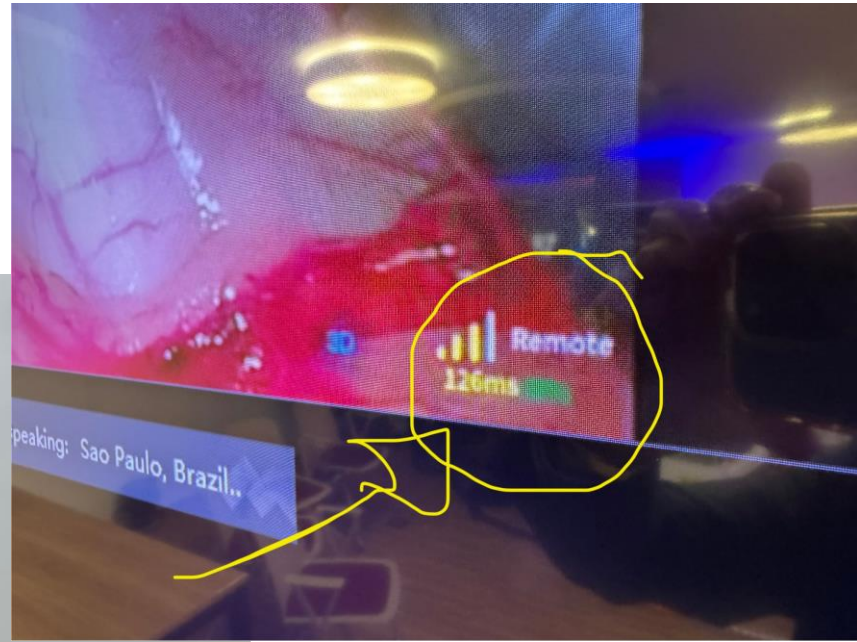
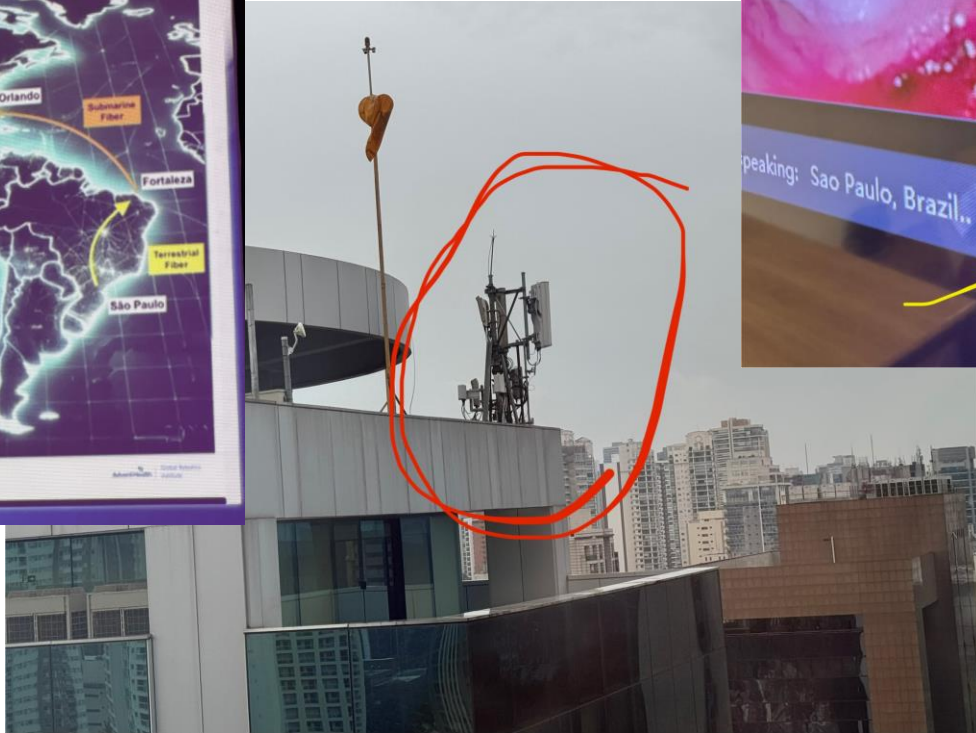
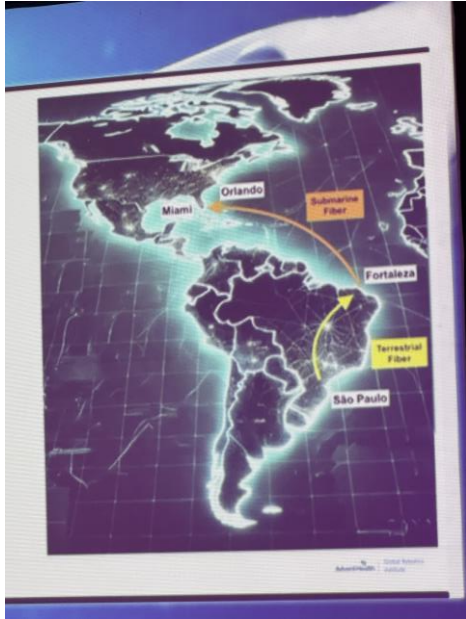


BREAKING:

China launches world's first 10G broadband network, delivering 9,834 Mbps download and 1,008 Mbps upload speeds.

[Traduzir post](#)



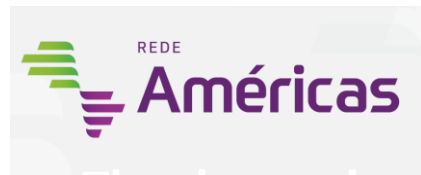




Conclusion: Transforming the Future of Surgery

- ✓ Telesurgery is not just a futuristic vision — it's a **present-day reality** transforming surgery
- ✓ The convergence of robotics, 5G networks, and AI is creating unprecedented opportunities for **global surgical care**
- ✓ Despite challenges, the benefits of improved outcomes, precision, and accessibility are driving rapid adoption
- ✓ As we continue to push the boundaries of what's possible, we can look forward to a future where surgery is **safer**, **more accessible**, and **more effective** for everyone.

"Telesurgery has the potential to democratize surgical care, bringing the expertise of the world's best surgeons to every corner of the globe."



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