

Surgical AI Breakthrough for MedTech OEMs

With LTTS' Digital Twin Platform



Purposeful. Agile. Innovation.

STATE OF MARKET

The global healthcare industry is rapidly moving toward AI-driven precision, leveraging digital twins, real-time navigation, and predictive analytics for redefining patient care and wellbeing. As the market expands, the need for intelligent systems that can improve and strengthen clinical accuracy, reduce risk, and enhance patient outcomes has never been greater.

CHALLENGES

However, the existing ecosystem continues to be defined by challenges around:

- Limited real-time visibility for complex interventions,
- High risk of mis-navigation and scope placement errors,
- Slow and expensive clinical trials and validation cycles,
- Fragmented, non-integrated solutions lacking predictive intelligence, and
- Increasing pressure on OEMs to differentiate with AI-powered innovation.

LTTS' SOLUTION

To tackle challenges around limited visibility, high navigation risk, and slow validation cycles, the team at L&T Technology Services (LTTS) developed an AI-powered, end-to-end Digital Twin and Navigation ecosystem that enhances clinical precision, accelerates OEM innovation, and improves patient outcomes. This includes:



AI-Driven Digital Organ Twins

A fully digitized lung model simulating real organ behavior, enabling detailed planning, prediction, and clinical simulation, with

- AI-Powered Segmentation and Detection
- Lung segmentation, tumor segmentation, and identification of anatomical regions (upper, middle, lower lobes) are fully AI-driven.
- AI models, including GAN-based architectures, provide highly accurate segmentation, outperforming traditional approaches and basic off-the-shelf models.
- These results ensure better precision in clinical planning and OEM product development.
- Support for OEM platform innovation and helping providers plan with confidence.





Virtual Bronchoscopy Navigation

A non-invasive, AI-enabled navigation tool for safer airway procedures.

- 3D airway reconstruction for full pre-procedure visibility
- Automated branch labeling and guided navigation
- Blood vessel proximity mapping to reduce risk of vessel injury
- AI-assisted scope path planning for predictable navigation
- Low-latency video analysis and image registration
- Enhances OEM navigation systems with real-time clinical intelligence



Synthetic Data Generation

Accelerated AI model training and product validation.

- High-quality, diverse datasets supporting training, testing, and regulatory submissions
- Reduces dependence on clinical trials and speeds up OEM development cycles

KEY FEATURES

Our solution enables:



Enhanced Visualization

- UI design and workflow development
- Lung segmentation
- Multi-volume rendering



Reliable Segmentation

- Airway, blood vessel, and tumor segmentation
- Lung, airways, and tumor volumetric measurements
- Assessment of lung capacity and airway diameters



Access to Structural Twin and Navigation

- Development of the 3D Structural Twin
- Integration of segmentation and visualization modules
- Measurement and analysis tools
- Virtual navigation integration for real-time guidance



BENEFITS

- Over 90% of core functionality is AI-driven, from segmentation to detection to predictive modeling.
- GAN and advanced AI models provide higher accuracy than traditional methods
- Increased surgical precision with AI-driven support
- Reduced risk of procedural errors and vessel injuries

LTTS Edge

- Deep expertise in AI, AR/VR, digital imaging, and real-time navigation
- Proven partner to global healthcare OEMs, and top providers
- Ability to deliver end-to-end clinical intelligence solutions
- Strong regulatory awareness and clinically aligned engineering

