IHS
INTELLIGENT HAPTRONIC SOLUTIONS

Haptic · AI · Service

IHS · Haptic Techonology Platform

Leading Haptic Simulation Platform Provider

Company Introduction

in https://www.linkedin.com/company/intelligent-haptronic-solutions/

🌐 https://www.intelligent-haptronic-solutions.com/

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📍 #1200-555 W Hastings, V6B 4N6, Vancouver, BC, Canada

Intelligent Haptronic Solutions Inc.

Founded in 2017 with two centers in Shenzhen and Vancouver, Canada, and a multinational team of senior technical and market experts from China

01

A cutting-edge haptic technology platfor with advanced VR force feedback and AI virtual training systems.

02

An in-depth partnership with several renowned hospitals and medical schools in China and North America.

03

EndoGITrain, China's first self-developed digestive endoscopy training simulator, was unveiled in Shenzhen at the end of December 2020, put into commercial trial operation in April 2021, and mass-produced in the second quarter of 2022.

04

IHS Company Profile

IHS, established at the end of 2017, is a multinational technology company specializing in the research and development of haptic technology and its application development. It has dual centers in Shenzhen, China, and Vancouver, Canada. The company boasts an international team composed of several senior technical and marketing experts from China and Canada, possesses full-stack independent R&D capabilities, and holds all the intellectual property rights for hardware design, software development, 3D modeling, and AI algorithms.

IHS's core technology has achieved commercial implementation in medical scenarios, successfully creating EndoGITrain Device. This innovation covers the teaching and training needs for digestive and respiratory internal medicine surgeries. Its goal is to break away from traditional apprenticeship models, revolutionizing the learning process by significantly shortening the learning curve and enhancing efficiency and quality.

 IHS has pioneered world-class haptic human-machine interaction solutions that integrate advanced technologies such as haptics, virtual reality, artificial intelligence, and cloud computing. This approach offers integrated hardware and software solutions and services for various application scenarios, including medical surgery, the automotive industry, and gaming entertainment. And thus, it forms a "Haptics+" technology platform.
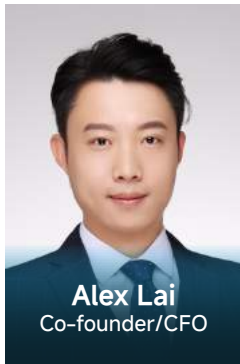
Core Team
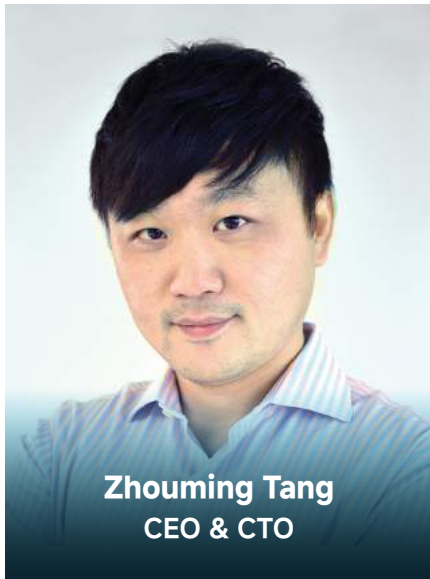
Zhouming Tang
CEO & CTO

- SFU, MASc.,Robotics/Haptics
- 10+ yrs haptic/medical robotics R&D experience
- 6+ yrs silicon design/validation experience
- Formal senior SOC architecture engineer at Microchip
- Multiple patents related to surgical training simulation
- 5+ related IEEE conference publications

Alex Lai
Co-founder/CFO

- Shenzhen University, BEc
- 10+ yrs Venture Capital investment experience 10+ yrs corporate finance experience
- Formal Alibaba financial team member
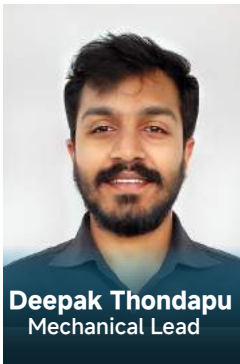
Deepak Thondapu
Mechanical Lead

- SFU, M.Eng., mechatronic system engineering
- Extensive mechanical design, manufacturing
- Previously worked as mechanical engineer in aeroengine design in Cyient, India

Qu Deng
Project Director

- Wuhan University, China, B.A.Sc, Computer Science
- 10+ yrs medical software project management experience
- Deep understanding about the medical industry
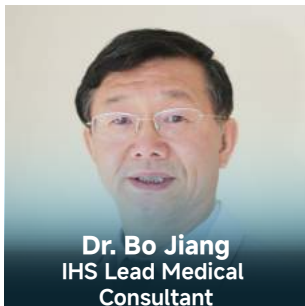- Experienced with medical customer relations
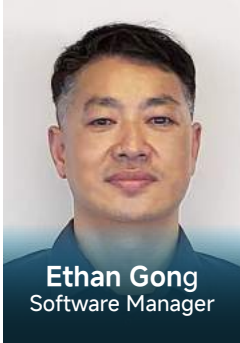
Ethan Gong
Software Manager

- Concordia U., M.A.Sc, Computer Science
- 15+ years software development, game development
- Has held leading technical role in various well known game company like Gameloft

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Conslutant

Dr. Bo Jiang
IHS Lead Medical Consultant

- Director of department of astroenterology, Tsinghua Chang Gung Hospital
- Nation's renown expert in gastroenterology and digestive endoscopy operation
- Extensive experience in applying surgical simulator in practical surgical training
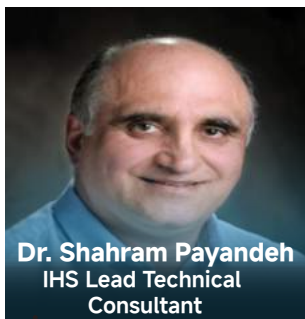
Dr. Shahram Payandeh
IHS Lead Technical Consultant

- SFU professor, well known and respected researcher
- Research fields include medical robotics, haptics, computer vision, virtual reality etc.
- Have obtained multiple U.S. patents and publications in world renown journals

Kirk Moir
VentureLals EIR

- SFU VentureLabs EIR
- 25+ yrs developing innovative products, successful entrepreneur
- Cofounded tech companies recognized by Deloitte as the fastest growing wireless technology provider in Canada and among fastest growing technology startups in North America

Dr. Fergal Donellan
IHS Medical Consultant

- Gastroenterologist at VGH, Gastroenterology/ Therapeutic Endoscopy/ERCP/Capsule Endoscopy
- Professor of Medicine, UBC

IHS Cooperating Organization

Collaborative R&D Base

SFU

NRC

UBC

Collaborative Clinical Base

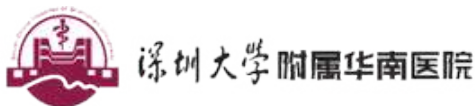Tsinghua University Affiliated Beijing Tsinghua Changguang Hospital

Southern Medical University Shenzhen Hospital

Fujian Province Cancer Hospital

Shenzhen University General Hospital

South China Hospital of Shenzhen University

Key Parnters

American Society for Gastrointestinal Endoscopy

Bosch

Vancouver General Hospital

SonoScape
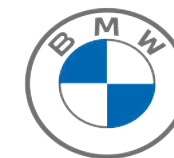
BMW

Microsoft

ByteDance

Pico Virtual Reality

Audi

# IHS Intellectual Property & Certification

National High-Tech Enterprise Certification

CE Certificate

The team has obtained one U.S. patent, four Chinese invention patents, one design patent, and more than 20 software copyrights. Additionally, the team has published over 20 papers in well-known international academic journals and currently has more than 50 patents pending or planned for application.
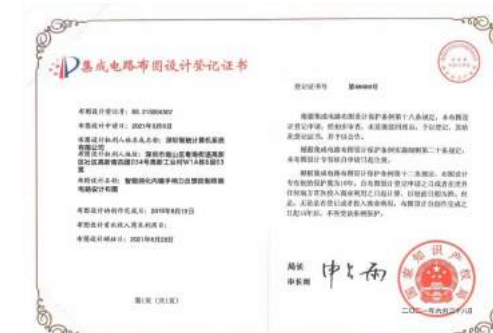
"Haptics+" Technology Platform

The core of the IHS "Haptics+" Technology Platform lies in its human-machine interaction system, which is uniquely established on a proprietary foundational haptic protocol. This system is a synergy of hardware, software, and algorithms, effectively bridging the gap between haptic perception and feedback. By establishing this connection, it forms a loop of haptic interaction, culminating in a closed-loop human-machine interaction system that facilitates bidirectional information exchange.

Haptics

Haptics embedded system
Haptics embedded controller
Mech design and math modeling

Virtual Reality

VR 3D deformable modeling
VR collision detection
VR haptics engine

Artificial Intelligence

AI haptic machine learning
AI 3Dmodel reconstruction
AI path planning
AI motion planning

Cloud Technology

IHS customer data management
IHS cloud platform data encryption

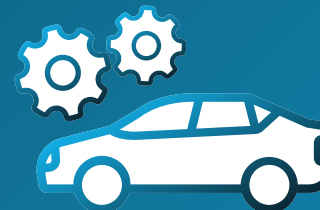## Three Core Scenarios

Surgical Training (Haptic + VR + AI)

Surgical training
Surgical assistance
Remote surgery

Automotive · Industry (Haptic + VR + AI)

Smart cars, smart cockpits
Precision instrument design and maintenance
Jewerly and gold design & repair
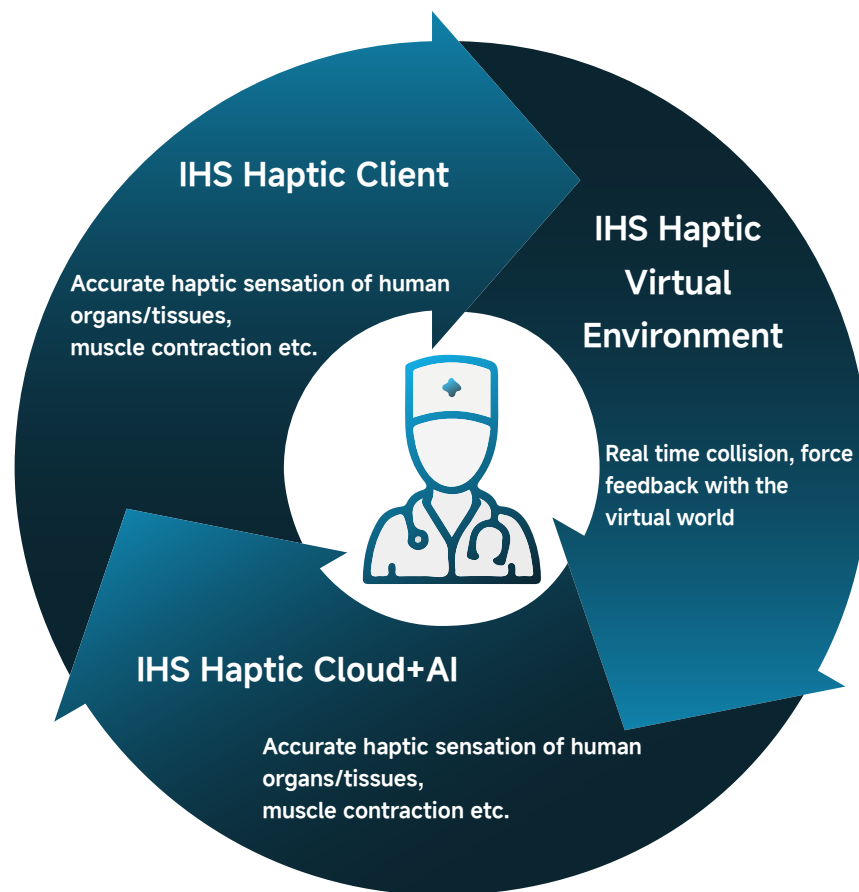
Gaming · Entertainment (Haptic + VR + AI)

Immersive haptic simulation
Remote tactile social interaction
VR haptic interactive games
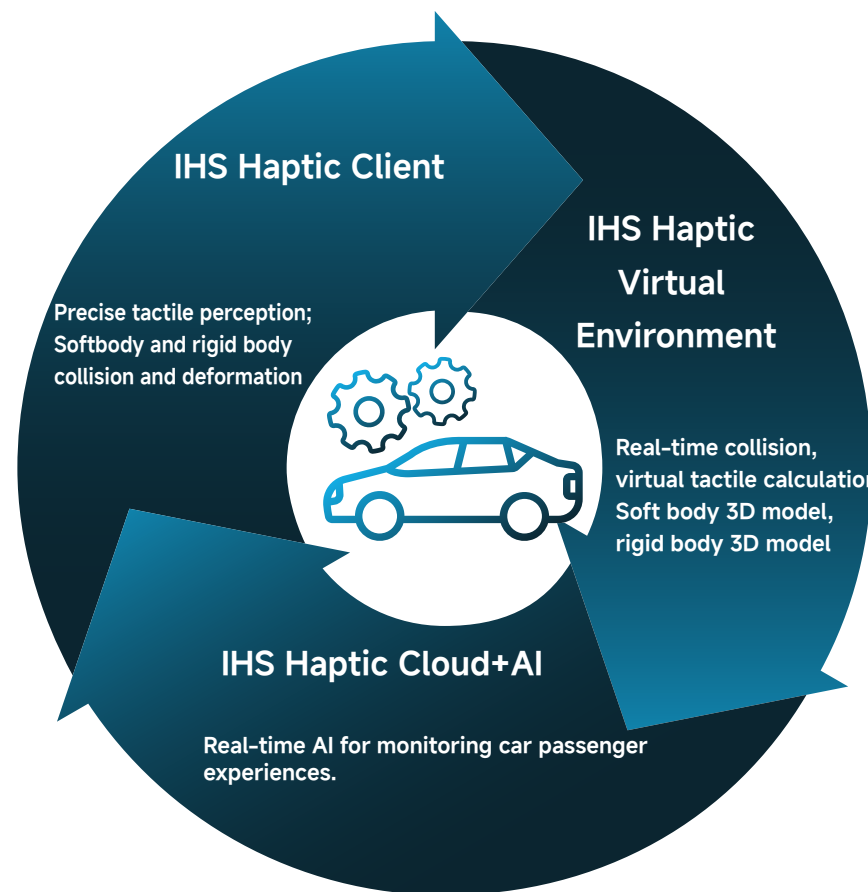
Core Technology Application Scenarios

Use Case One
Surgical Training Haptic + AI + VR

IHS Haptic Client

Accurate haptic sensation of human organs/tissues, muscle contraction etc.

IHS Haptic Virtual Environment

Real time collision, force feedback with the virtual world

IHS Haptic Cloud+AI

Accurate haptic sensation of human organs/tissues, muscle contraction etc.

Use Case Two
Automotive & Industry Haptic + AI + VR

IHS Haptic Client

Precise tactile perception; Softbody and rigid body collision and deformation

IHS Haptic Virtual Environment

Real-time collision, virtual tactile calculation Soft body 3D model, rigid body 3D model

IHS Haptic Cloud+AI

Real-time AI for monitoring car passenger experiences.

Use Case Three
Gaming & Entertainment Haptic + AI + VR

IHS Haptic Client

Precise tactile perception; Softbody and rigid body collision and deformation

IHS Haptic Virtual Environment

Real-time collision, virtual tactile calculation Soft body 3D model, rigid body 3D model

IHS Haptic Cloud+AI

Real-time AI for monitoring and analysis of music, video, games, social interactions, etc.
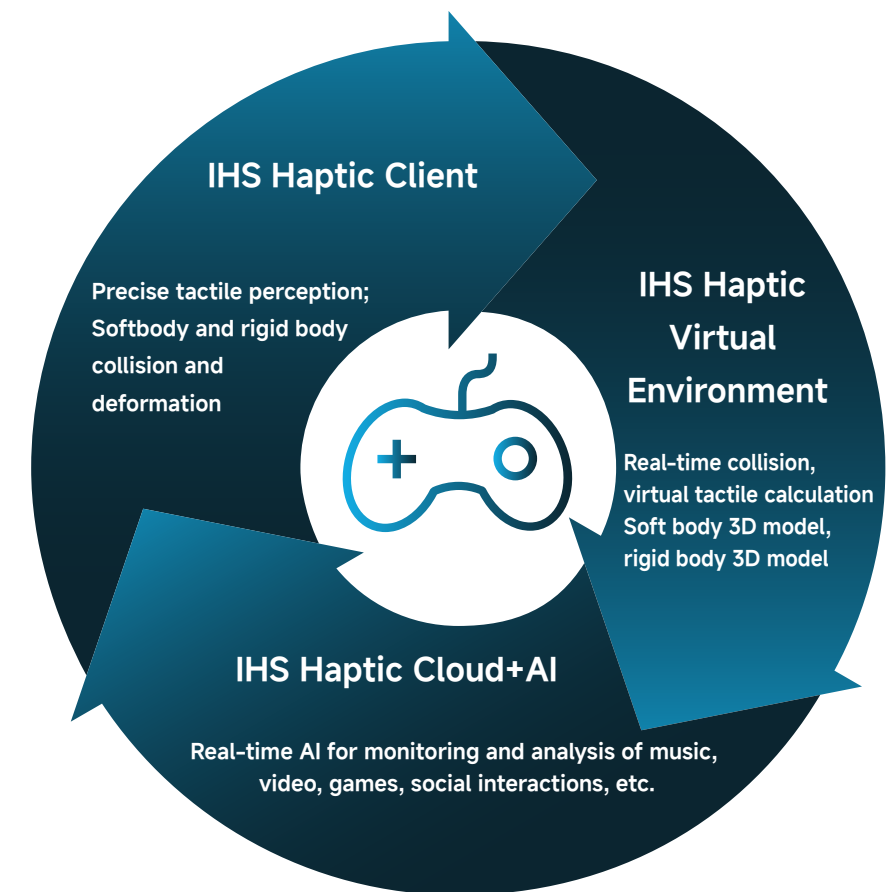
EndoGITrain Broncho-GI Pro

Function overview:
1. Training and assessment for upper and lower GI tract and bronchial endoscopy operations.
2. Real-time AI monitoring and guidance for virtual surgery training operations, including comprehensive scoring.
3. Typical case teaching for endoscopic examinations.
4. Preparation of endoscopic surgical plans.

EndoGITrain GI Lite

Function overview:
1. The endoscopy operation can be paused/restarted through button settings.
2. Experience the full range of digestive endoscopic handle force feed-back/biopsy force feedback.
3. Compact and portable, ideal for large-scale training.
4. Affordable, suitable for small and medium-sized hospitals and training

IHS EndoGITrain GI Lite Software

No terminal device is required; operations can be performed on a computer terminal or VR headset.

This is suitable for knowledge-based training of students in school, such as:
1. Lesion identification 2. Digestive tract pathway identification 3. Report writing.
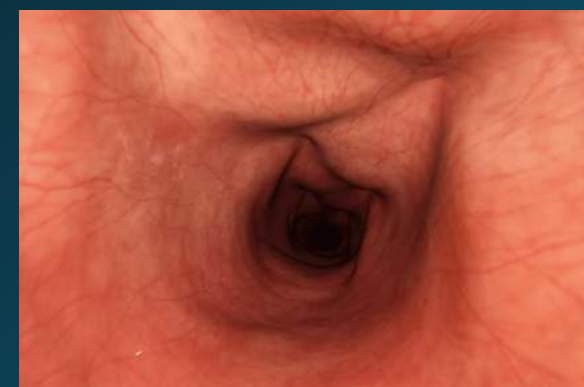
EndoGITrain Broncho-GI Pro Training Modules

IHS

Upper GI (Gastroscope) Training Module

▶ Basic endoscope skills training module for upper GI

Training in the operation of gastroscope handle buttons, lens aiming/rotation, flushing/suction, and photography, among other skills, to improve the hand-eye coordination of doctors; includes three typical training cases involving the esophagus, stomach, and duodenum.

▶ Training module for upper GI endoscopic examination

Training in upper GI and duodenal examination and photography using the gastroscope handle;
Identification of anatomical markers (polyps, ulcers, etc.), preparation of examination reports, etc.
Includes training cases such as normal tissue, ulcers, polyps, tumors and esophageal varices.

▶ Training module for upper GI endoscopic therapy

Training in biopsy sampling and excision using biopsy forceps and snares;
Removal of foreign bodies in upper GI;
Training in endoscopic mucosal resection (EMR);
Electrocoagulation hemostasis with chlorine gas cutting;
Hemorrhage and hemostasis training module.

▶ Training guidance and assessment module

Provides upper GI examination routes, real-time guidance for the examination and photography, and real-time video recording of the training;
Shows the photos of the corresponding training process and its coverage area on a 3D model;
Provides analysis and grading of standardized intelligent training in gastroscope handle operation;
Provides comprehensive analysis and grading of standardized intelligent training in upper GI examination (EGD).

Training Content Diagram - 3D Model

Lower GI (Colonoscope) Training Module

▶ Basic endoscope skills training module for lower GI

Training in the operation of gastroscope handle buttons, lens aiming/rotation, flushing/suction, photography and other skills to improve the hand-eye coordination of doctors;
Training cases such as turning of the rectosigmoid junction, prolapse of the transverse colon, air in the hepatic flexure, terminal ileum, ileocecal valve identification, etc.

▶ Training module for lower GI endoscopic examination

Identification of anatomical markers (polyps, ulcers, etc.), polyp sampling, preparation of examination reports, etc.
Includes training cases such as normal tissue, polyps, tumors and Ulcerative colitis.

▶ Training module for lower GI endoscopic therapy

Training in biopsy sampling and excision using biopsy forceps and snares;
Training cases such as polyps, tumors, vascular malformations and hemorrhoids;
Hemorrhage and hemostasis training module;
Training in endoscopic mucosal resection (EMR);
Electrocoagulation hemostasis with chlorine gas cutting.

▶ Training guidance and assessment module

Provides lower GI (colonoscopy) examination routes, real-time guidance for the examination and photography, and real-time video recording of the training;
Shows the photos of the corresponding training process and its coverage area on a 3D model;
Provides analysis and grading of standardized intelligent training in colonoscopy handle operation;
Provides comprehensive analysis and grading of standardized intelligent training in lower GI examination (colonoscopy).
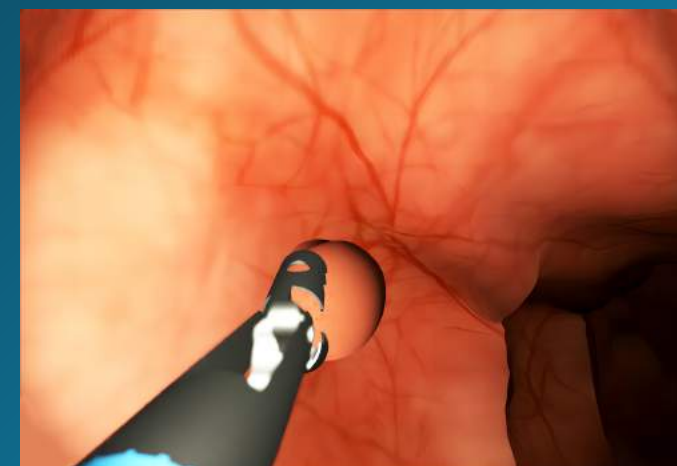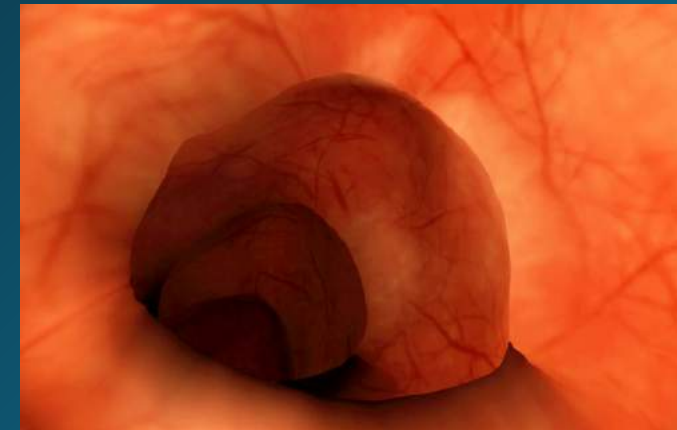
▶ Advanced surgical training modules under development

ERCP (Endoscopic Retrograde Cholangiopancreatography) training module;
EUS (Endoscopic Ultrasonography) training module;
ESD (Endoscopic Submucosal Dissection) training module

Training Content Diagram - 3D Model

Bronchoscope Training Module

▶ Basic bronchoscope training module

Provides the anatomical structure of the bronchial tree, and displays the anatomical name of the lens's location as the bronchoscope enters the bronchial tree;

Provides a real-time 3D view of the anatomy, showing the location of the lens within the bronchial tree;

The anatomical view can be zoomed in, zoomed out and rotated to view the anatomy from different angles;

Provides direction instructions to help trainees determine the orientation of the lens.

▶ Training module for bronchoscopic therapy

Includes bronchoscopy examination, practice with biopsy forceps, and the use of instruments such as cytology brushes;

Provides real-time tracheal access along with the selection of saline and medications like lidocaine;

Encompasses cases where chest X-rays did not reveal lesion locations, utilizing bronchoscopy for lesion detection and biopsy, malignant tumors, recurrent bronchial infections, sarcoidosis, lymphadenopathy;

Able to simulate the treatment of different patient conditions.

## Training Content Diagram - Training Content and Analysis Interface

Product Features

VR and haptic force feedback	Advanced virtual reality simulation and haptic feedback
Personalized training courses	Customized training based on the specific needs of trainees at different stages, and real-time guidance from the expert system.
3D rendered organ models	Fully simulated 3D organ models, reconstructed with clinically realistic patient case data.
Configured a Hierarchical Management System	Divided into three user modes: Expert, Administrator, and Trainee.
Grading and assessment system	Providing real-time guidance, professional and objective grading and assessment throughout the training.
Customizable endoscope handle design	Supports customization of the appearance of any model of endoscope handle available on the market..

Product Advantages

01 Uninterrupted force feedback is provided throughout the process, including during the operation of biopsy instruments, offering a sensation similar to that of real clinical procedures.

02 Full virtual simulation of a 3D rendered GI model is offered, providing more intuitive 3D organ views, and enabling flexible setting of cases and assessment items, compared to a silicone model.

03 Transforms the traditional apprenticeship mode of "hand-holding" endoscopy training to avoid the risk of novice doctors practicing on real patients.

04 Built-in rich training cases offer a sensation similar to real clinical scenarios, a feature lacking in traditional simulation training using animal organs.

05 Provides a variety of scenario-based simulation training options in clinical settings, simulates the entire process from patient consultation, examination, diagnosis and treatment to report preparation, and assesses the comprehensive ability of trainees.

06 Incorporates ERCP, EUS, ESD and other advanced surgical training modules to meet the deeper needs of doctors and improve their more advanced surgical skills.

07 Provides real-time guidance during the training, and automatically generates a training report after the training that clearly reflects the training and learning outcomes of each trainee.

08 Offers training in gastroscopy, colonoscopy and bronchoscopy to meet the training needs of multiple departments.
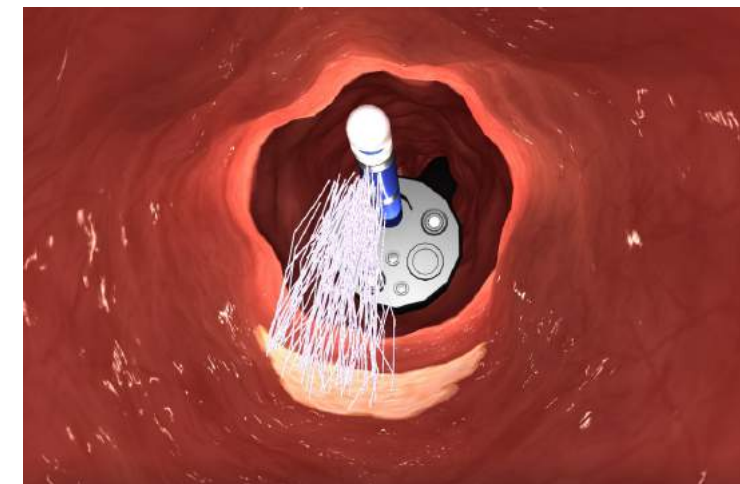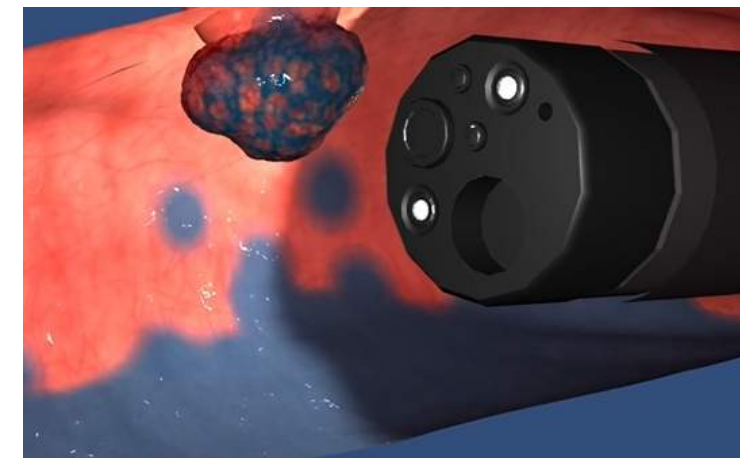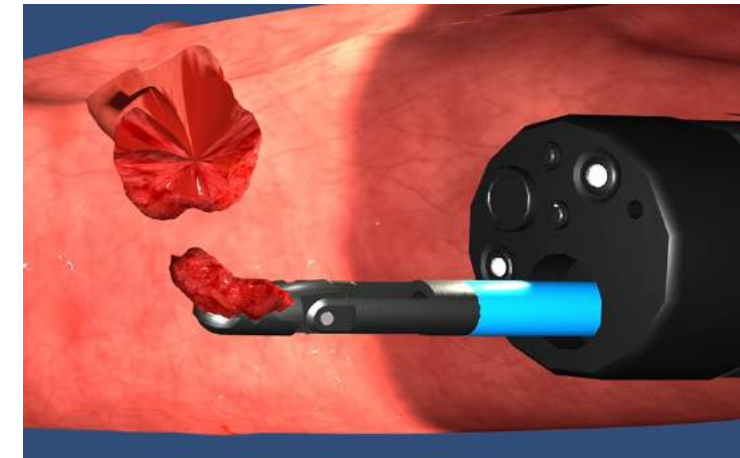
IHS Specialized Training Solution

Specialized training solutions

For beginners
Training includes the theoretical knowledge of endoscopy, functions of endoscope buttons, hand–eye coordination, and basic endoscopic operation skills.

For advanced trainees
Those who are familiar with basic endoscopic operations may receive training in the EGD module, which includes complex endoscopic procedures such as endoscopic biopsy, electrocoagulation hemostasis, and foreign body removal. This training aims to improve their comprehensive skills in endoscopic operations.

Advanced surgical training
This training is designed for doctors who have some experience in endoscopic operations and wish to receive training in complex and advanced surgical procedures. It includes advanced surgical exercises such as endoscopic ERCP, EUS, and ESD, as well as practical operation of surgical cases. The aim is to develop the comprehensive surgical skills of the trainees.

IHS Specialized Training Solution Provider

Taking the expert system of the digestive endoscopy training simulator as an example:

Real-time guidance
The system provides endoscopy routes, real-time guidance for the examination and photography, as well as real-time video recording of the operation.

Assessment and grading
The system analyzes and grades the results of the standardized and intelligent endoscopic operation training based on expert guidance. It also provides a detailed and scientific evaluation of the trainees' operation process.

Trainee management
There are three user modes: expert, administrator, and trainee. Experts can assign training tasks to trainees at different stages, and conduct assessments and grading of the training.

Online training solution
The system supports the uploading and downloading of courseware and teaching materials. It also provides a built-in courseware question library, grading and assessment functions, and customizable course content.

Specialized simulation training center
Medically specialized simulation training centers are established in cooperation with hospital skill centers or departments, providing personalized and diversified training solutions. In collaboration with medical associations, specialized simulation training centers are set up to meet the needs of trainees. Together, they develop specialized simulation training standards and issue simulation training certificates to qualified trainees.

IHS **Roadmap**

"Haptics+"
Technology Platform

Haptic + XR

Haptic
Interaction

Haptic + AI

2025

Laparoscopic Surgery
Training System
–Initial commercialization

Endoscopy SW System
–Data service extension

Automotive Haptic System
–Production release

VR Haptic Gaming System
–Product release

2024

Endoscopy Training System
–Device generation update

Endoscopy SW System
–Training modules/ Expert
System extension etc.

Automotive Haptic System
–Prototype

VR Haptic Gaming System
–Prototype

2023

Endoscopy SW System
–Traning modules/ Expert
System etc.

Endoscopy Training Extension
–Bronchoscopy; Cystoscopy
and/ or others

Automotive Haptic System
–Prototype

2021 & 2022

GI Endoscopy Traning System
–Commercialization release

Bronchoscopy Training
Extension
–Commercialization release

GI Endoscopy VR Training
Curriculums
–Development