



MOZI

The unique solution able to transform a standard Linac into an Online Adaptive system.

manteia

POWERED BY
TEMA SINERGIE
 High tech, high care



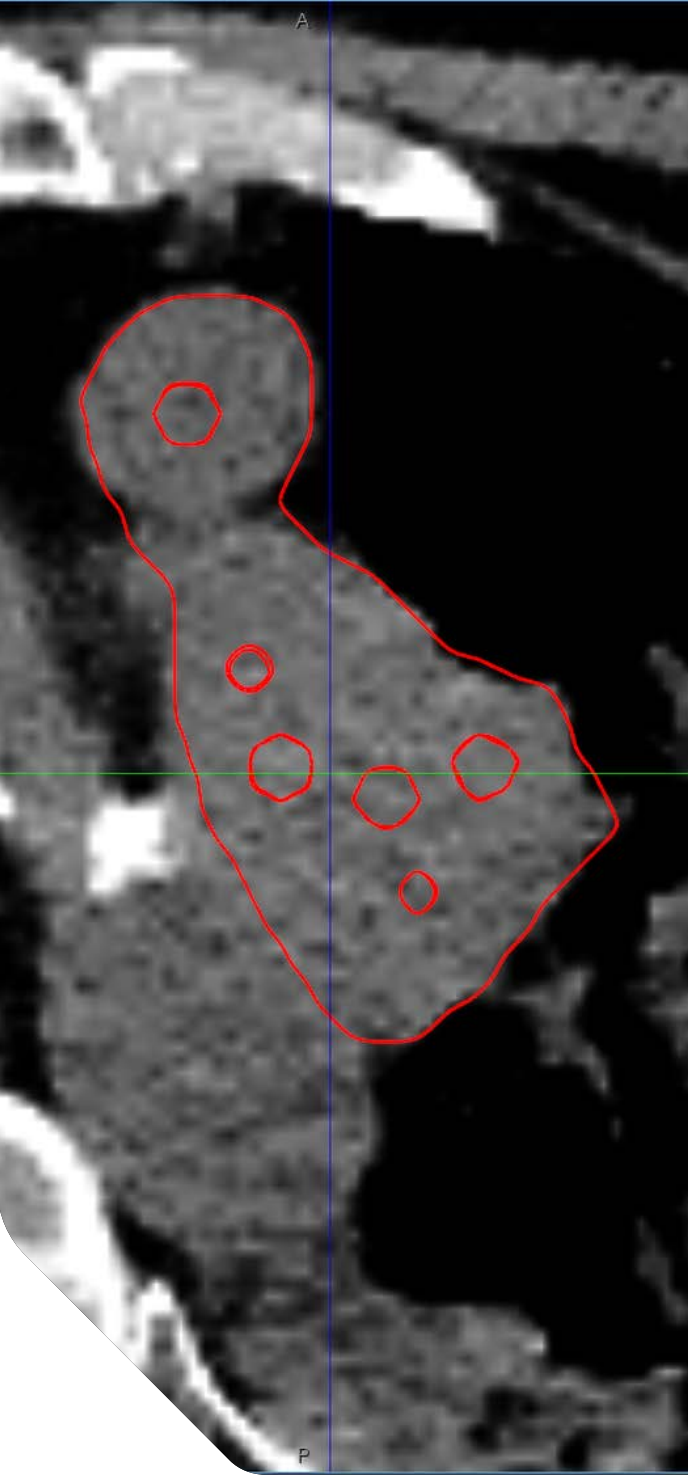
Manteia Technologies Co., Ltd. (Manteia) is an innovative company founded in 2017 by a research team of physicists and physicians from Prof. X. Allen Li Adaptive RT research group (2011~) at the Medical College of Wisconsin (USA). The company, now based in Xiamen (China), with over 150-member team, 70% dedicated to research and development, is a provider of game changing solutions for advancing Radiation Therapy, including AI-based dose distribution prediction, fully automatic planning and much more. Since the beginning, Manteia's goal core development is the ON-LINE Adaptive solution, to allow tailoring treatments in every fraction



Tema Sinergie SpA, is a company located in Italy with over 4 decades of experience in the fields of radiotherapy and nuclear medicine. With over 400 employees, it features a dedicated team with deep and specific know how in the management of treatment planning systems, from beam modeling/commissioning up to clinical training and whole time technical support, providing a significant added value to the nowadays European RT sites, everyday busier.

- + **SYSTEM HIGHLIGHTS**
On-line Adaptive Solution
Full AI-powered Automation
Monte Carlo Dose Calculation by GPU
Hardware Independence
- + **ARTIFICIAL INTELLIGENCE**
Deep learning segmentation
Deep learning planning
Deep learning training
- + **ON-LINE ADAPTIVE**
End-to-end Adaptive workflow
Upgrade Every Standard Linac to Adaptive

- + **IMAGE PROCESSING**
Fusion and Registration
Dose Accumulation
Synthesis CT Generation
- + **AUTOMATION**
Scripting
Planning Wizard
Dose Prediction
SOE Optimization
Beam Recommendation
Workflow
Virtual Planner
- + **COMMISSIONING, CHECK, GO**
Beam Modeling
Quality Assurance
Seamless connectivity
Linac vendor neutral

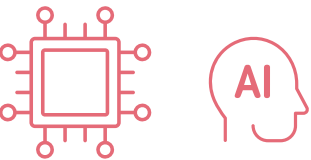


Introduction

Mozi represents the latest advancement in planning technology by offering enhanced quality and efficiency in the treatment planning process. Mozi incorporates personalized, patient-specific goals right from the beginning, along with AI-powered streamlined automation and on-line adaptive features, well-equipped to address your current planning needs and anticipate future advancements in the field.

+ **Key Features**

- AI-powered Automation
- GPU-powered Computation
- Monte Carlo Dose Calculation
- Revolutionary On-line Adaptive Planning



+ **Multiple Techniques**

- Planning: 3DCRT, IMRT, VMAT, SBRT/SRT, SFRT
- Adaptive to Shape: CBCT, MRI guided on-line adaptive planning

+ **Monte Carlo Dose Engine**

20s Monte Carlo to complete plan dose calculation and secondary dose check

+ **Auto-Planning**

Saves 80% time compared with manual planning

+ **On-line Adaptive**

12 min from daily imaging acquisition to re-contour, plan assessment, QA and treatment delivery

Multi-

20s

80%

12min



Treatment Planning

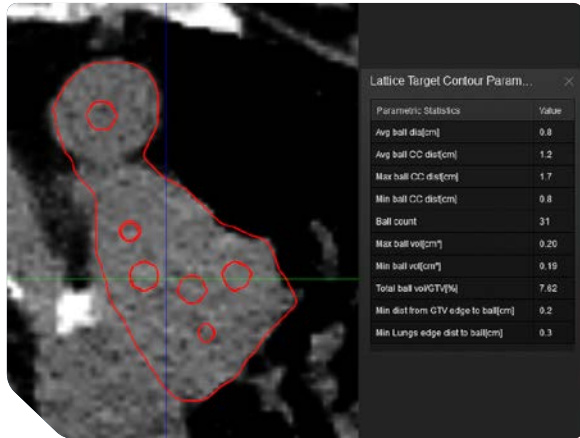
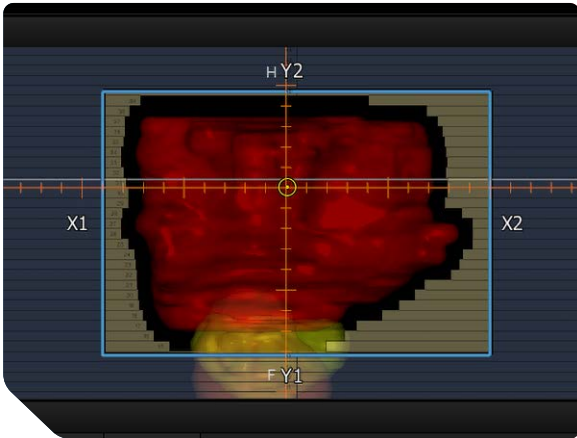
Optimize all possible treatment techniques

Mozi is designed to optimize a wide range of treatment techniques, accounting for tissue density and patient setup uncertainties.

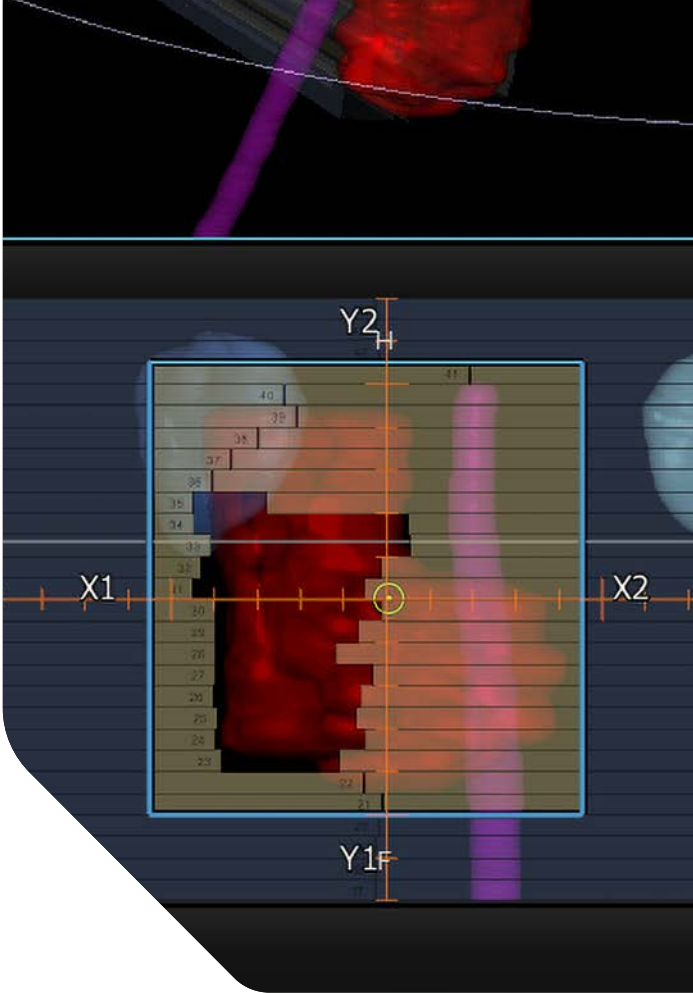
Powered by a high-performance dose engine with GPU-accelerated Monte Carlo and Collapsed Cone Convolution Superposition, Mozi delivers fast, accurate, and clinically reliable dose calculations.

Its ultrafast optimization engine effectively solves complex planning challenges, unlocking the full potential of modern treatment systems.

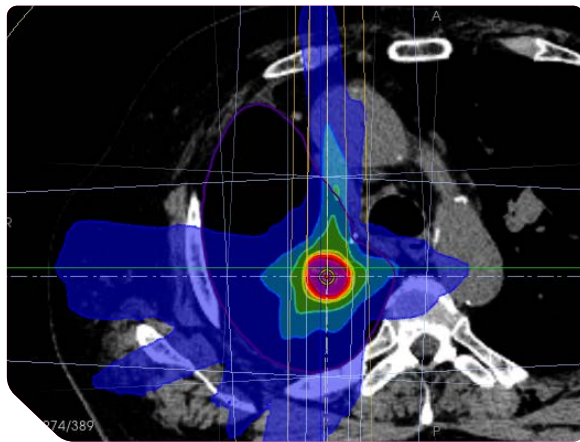
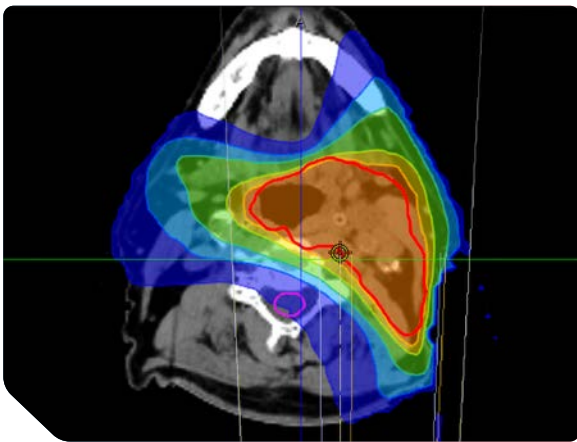
- + **3D-CRT**
Efficient and reliable conventional 3D-CRT treatment planning is achieved through a combination of manual and automatic tools for conformal treatment, including advanced inverse planning for auto beam setup and automatic optimization features based on various combinations of beam monitor units and collimator, gantry and couch settings.



- + **SFRT** | Spatially Fractionated Radiation Therapy
MOZI supports advanced SFRT planning through intelligent automation and high-precision Monte Carlo dose calculation. It enables automated generation of lattice structures within the target, helping streamline complex peak-and-valley dose designs. GPU-powered computation accelerates optimization, while patient-specific goals support robust and clinically efficient plan creation.



- + **IMRT / VMAT**
The design and optimization of IMRT or multiple-arc VMAT plans involve an inverse planning procedure. Objectives and constraints are set for the desired dose, and the system generates a plan that closely aligns with these criteria within the constraints of the treatment machine. The optimized plan is immediately deliverable, eliminating the need for post-processing that could compromise its quality.



- + **SBRT / SRT**
Utilize the same system for stereotactic and for your other type of treatments. MOZI provides a range of established tools to facilitate the development of high-quality stereotactic workflows. Leveraging GPU technology, it can rapidly optimize and calculate SBRT/SRT IMRT and VMAT plans, even for dose grids with a resolution as fine as 1 mm, completing calculations within seconds.

AI-elevated Automation: Auto Contouring

Manteia is deeply committed to automation, and AI technology elevates this commitment to a new height. Mozi design is both smarter and faster. Features like automated contouring and planning significantly enhance the efficiency of treatment planning procedures.

+ **AI Contouring for CT/MRI/CBCT**
Extensive contour library ready for use

350+ **CT/CBCT Models of Whole-Body**
including organs-at-risk, lymph nodes, substructures & tumour targets

80+ **MRI Models of Organs at Risks**
multi-modality support (T1,T2, etc.)

Endless Totally Personalized Contour Possibilities with AccuLearning

Efficiency



Zero-Click Workflow



Contour QA

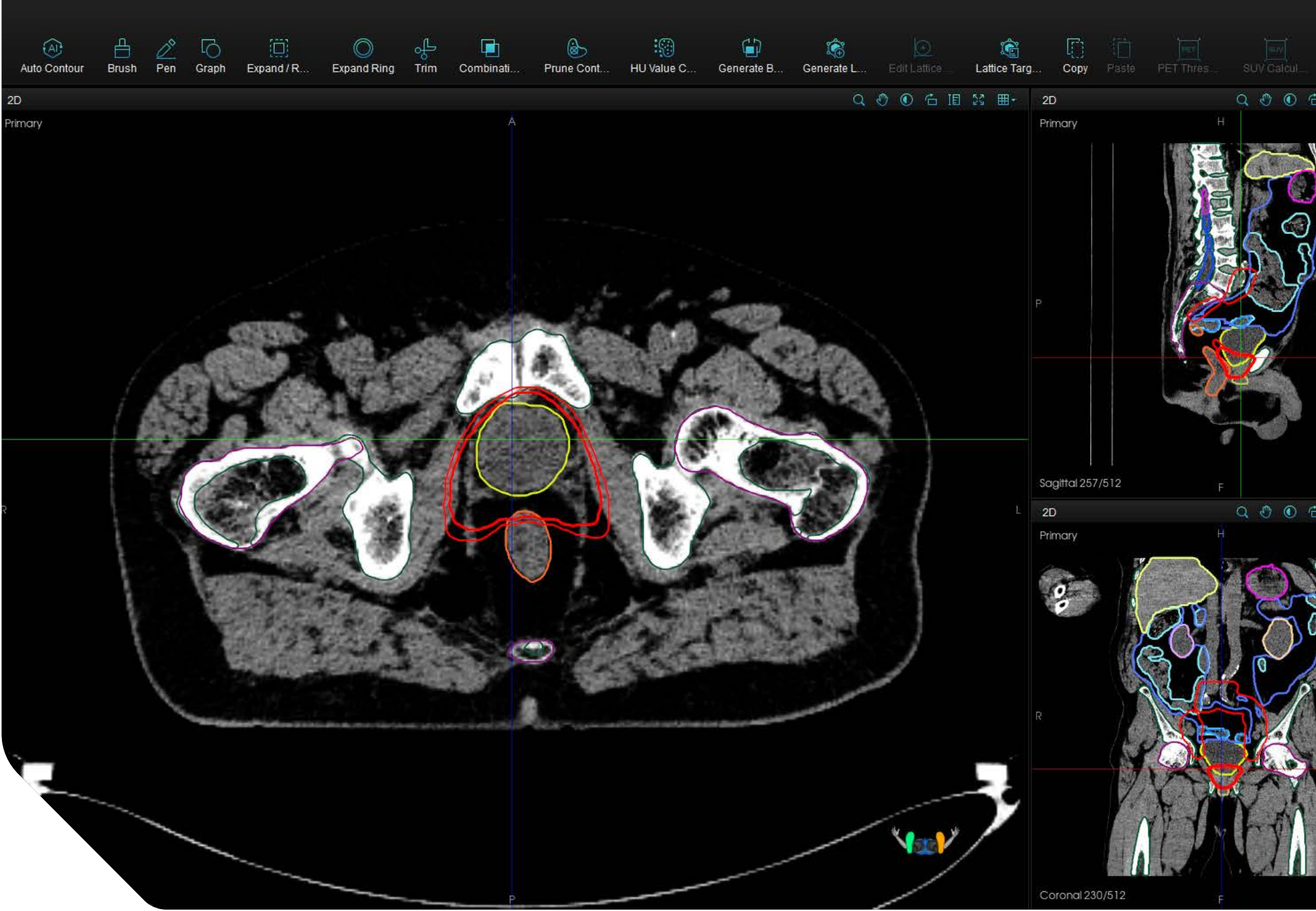
MOZI enables intelligent contour QA using clinical logic and grayscale texture analysis to detect inconsistencies and guide users to refine contours where needed.

Smart Editing Tool

Mozi's intelligent contour editing tools enable clinicians to easily fine-tune AI-generated results, streamlining manual editing and final review.

Standardization

Mozi's configurable preset templates support guideline-based or user-defined naming, colors, and contouring standards, ensuring consistent and accurate planning workflows.



AI-elevated Automation: Auto-Planning

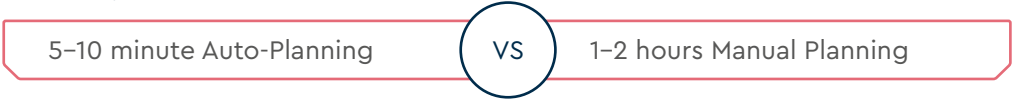
Mozi delivers comprehensive, AI-powered automation across the entire treatment planning workflow — from intelligent constraint generation to fully autonomous plan creation.

+ Smart Optimization Engine (SOE)

SOE in Mozi automatically optimizes treatment plans based on the clinical priority of targets and OARs, delivering consistent, high-quality results comparable to experienced planners with minimal manual intervention. Combined with Monte Carlo dose calculation, it ensures accurate and reliable dose distribution within a fully automated workflow.

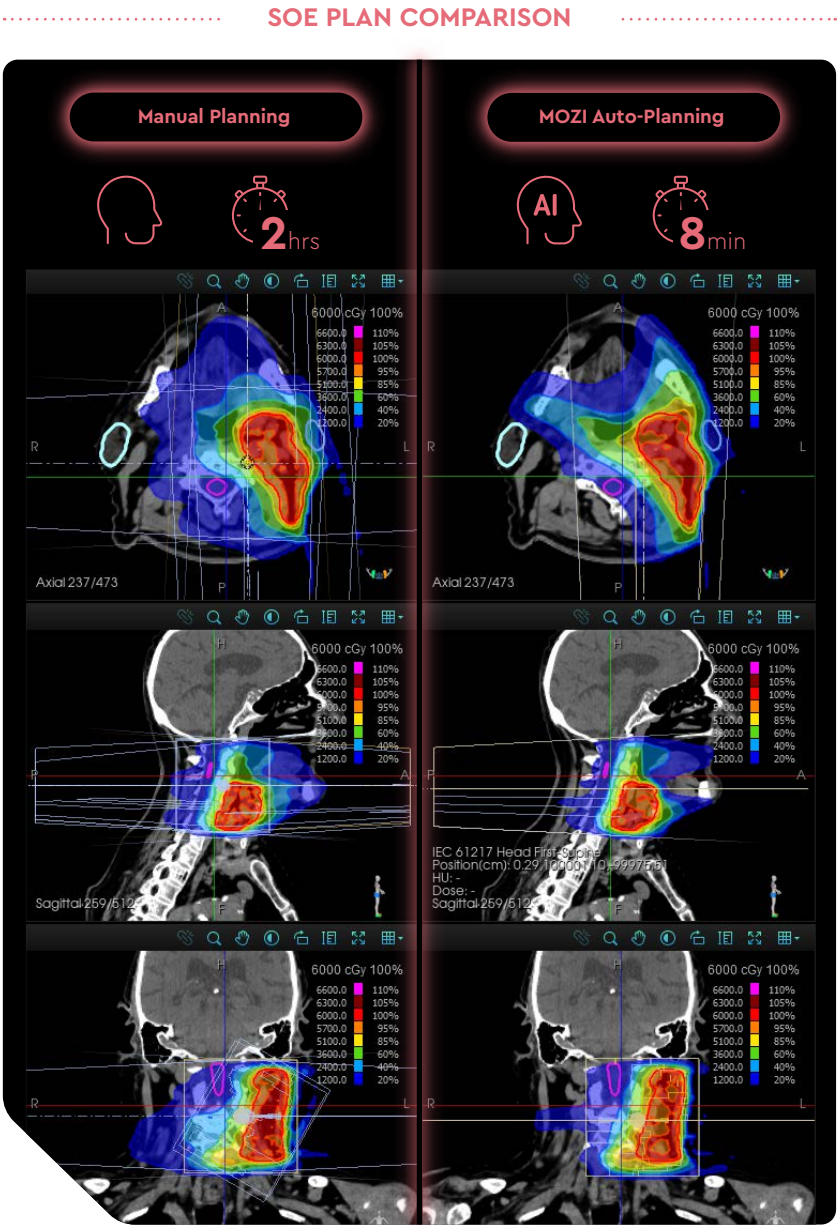
- AI-based iterative and progressive auto-planning algorithm
- Works for all cancer types, even complex cases
- Consistent and reproducible results

Efficiency



How it works

1. Prioritizes clinical goals
2. Auto= optimizes beam weights, MLC shapes, and segment intensities
3. Generates clinically deliverable dose distributions



Dose Prediction by Deep-learning

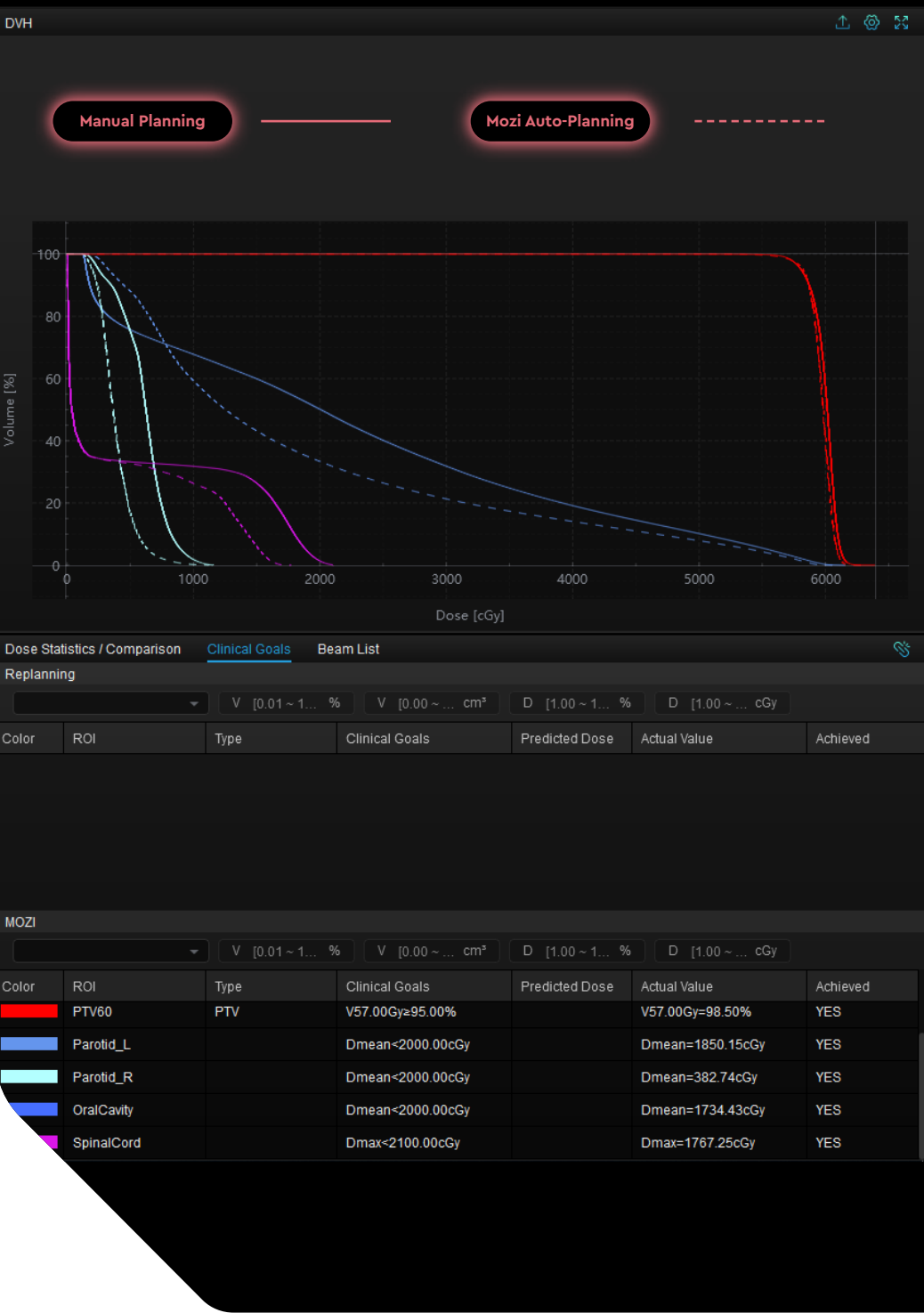
The Dose Prediction in Mozi leverages patient images, contours, and selected deep learning models to generate expected dose distributions, which can be directly used as optimization constraints. With built-in models for multiple disease sites, enables fast and consistent automated planning. Moreover, users can develop and continuously refine personalized models through AccuLearning, utilizing limited historical data to further accelerate planning.

Automated Plan Generation by Planning Wizard

The Plan Wizard in Mozi automatically generates derived structures and plans using predefined scripting, configuring beams, optimization constraints, and clinical goals based on target types, volumes, and key clinical requirements. It enables seamless creation of 3D-CRT, IMRT, VMAT, and SFRT plans, delivering fast, consistent results for both single and nested target cases.

Scripting & Workflow

Python scripting provides access to a wide range of capabilities within the operating system and other applications. This includes the ability to write files, initiate processes, establish communication with other systems and control scriptable applications. The workflows, on the other end, allows the recording of operational and application creating automated scripts that replicate your actions in plan design.



Advanced Planning

Mozi provides a variety of advanced planning tools, including plan library, dose brush, and MCO—giving users the flexibility to choose the most suitable strategy for each case.

Plan Library

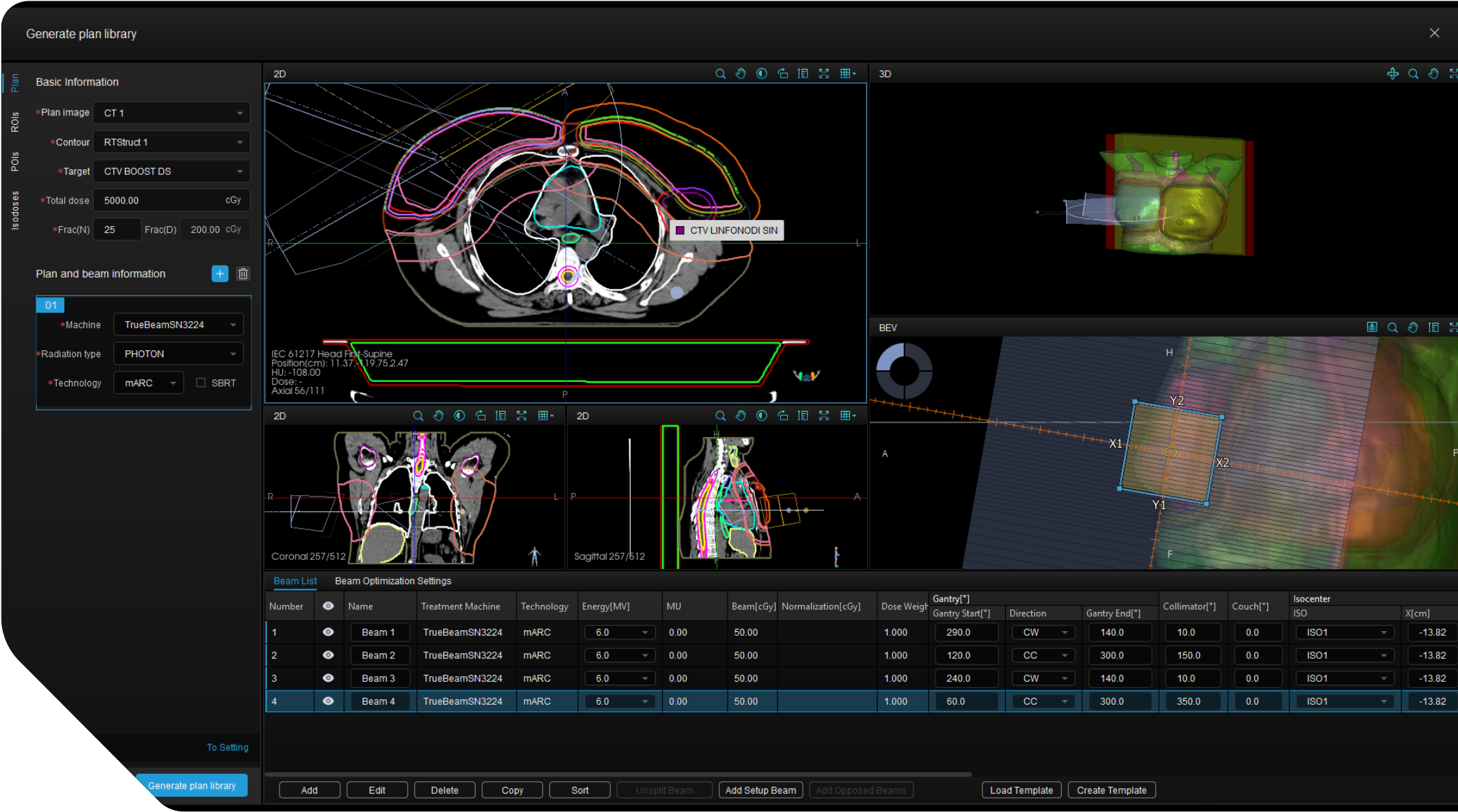
Plan Library automatically generates multiple clinically deliverable treatment plans using automated inverse planning and optimization based on prioritized clinical goals. It evaluates and ranks these plans through a scoring system, enabling users to efficiently compare and select the optimal plan for further refinement.

Dose Brush

Dose Brush is an interactive tool that lets users directly “paint” and adjust dose distributions in 2D views. The system converts these edits into optimization constraints and automatically refines the plan for efficient dose fine-tuning.

Robust Optimization

Robust Optimization in Mozi photon TPS simulates setup and density uncertainties by generating multiple error scenarios, ensuring the optimized plan maintains clinical target coverage and OAR sparing under variations, thereby improving plan robustness and treatment reliability.



AccuLearning Integration

AccuLearning provides interactive and personalized model training functionalities. It can be used to provide AI training data to customize Mozi's AI models for auto-contouring, auto-planning, image synthesis (CBCT/MRI → sCT) and survival models (TCP/NTCP).

+ AI Training Research Platform

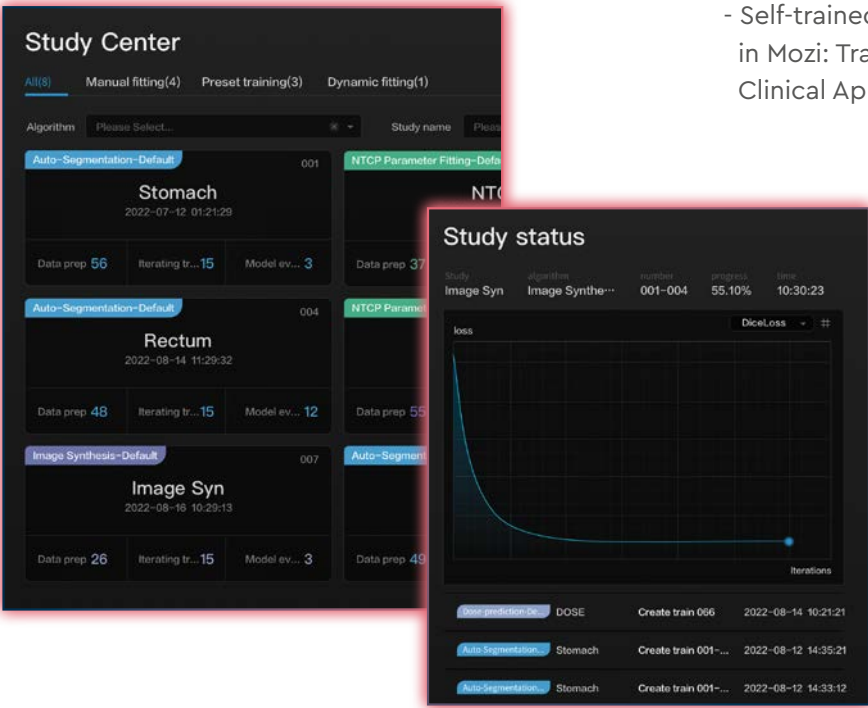
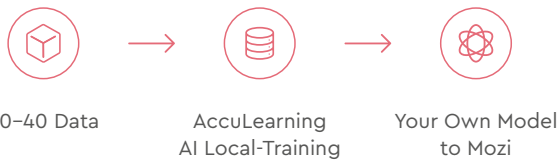
- AI Contour Model Training (CT/MR)
- Image Conversion Model Training
- Dose Distribution Model Training
- TCP/NTCP Model Training

+ Highlights

- No programming experience required for AI related research
- Highest Data Security (Local Installation)
- Minimal Data Requirement: 20–30 cases for most studies, 50 cases for complex studies
- Self-trained models can be shared and applied in Mozi: Transformation from Research to Clinical Application

+ AccuLearning Training Workflow

Full-scale mock-ups to test required ergonomic and customizations, optimizing the design process and preventing time-consuming adjustments during production



The ON-LINE Adaptive Solution

Mozi is the most performing solution available in the market for ON-LINE Adaptive Radiation Therapy, literally able to transform a standard Linac into an Online Adaptive system. It is crafted to dynamically adjust radiation therapy in real-time, customizing treatment based on the evolving anatomy and positioning of tumors as well as the surrounding healthy tissues. This methodology guarantees utmost precision in targeting cancer cells, thereby markedly minimizing the impact on healthy tissues. Full compatibility with all TPS and Linacs, including MR-Linacs.

Challenges

Unsatisfied Image Quality

Guiding Images with poor quality and/or short in length scale

Time-consuming Contours

1-4 hours for manual contouring

No way to Re-Plan

Conventional TPS face limitations with directly planning on CBCT or MR

No On-line QA

A rapid and accurate secondary dose verification for online adaptive RT plans is essential, but currently, there are no integrated available tools

Mozi's Strategic Solutions

Synthetic CT for Direct Planning

Post-process CBCT/MRI guided images in quality enhancement, FOV extension, modality conversion

Auto-Contouring

Deep Learning based auto-contouring or contours transferring by rigid or deformable image registration

Rapid Replanning Strategies

Offer a range of shortcuts to expedite the re-planning process

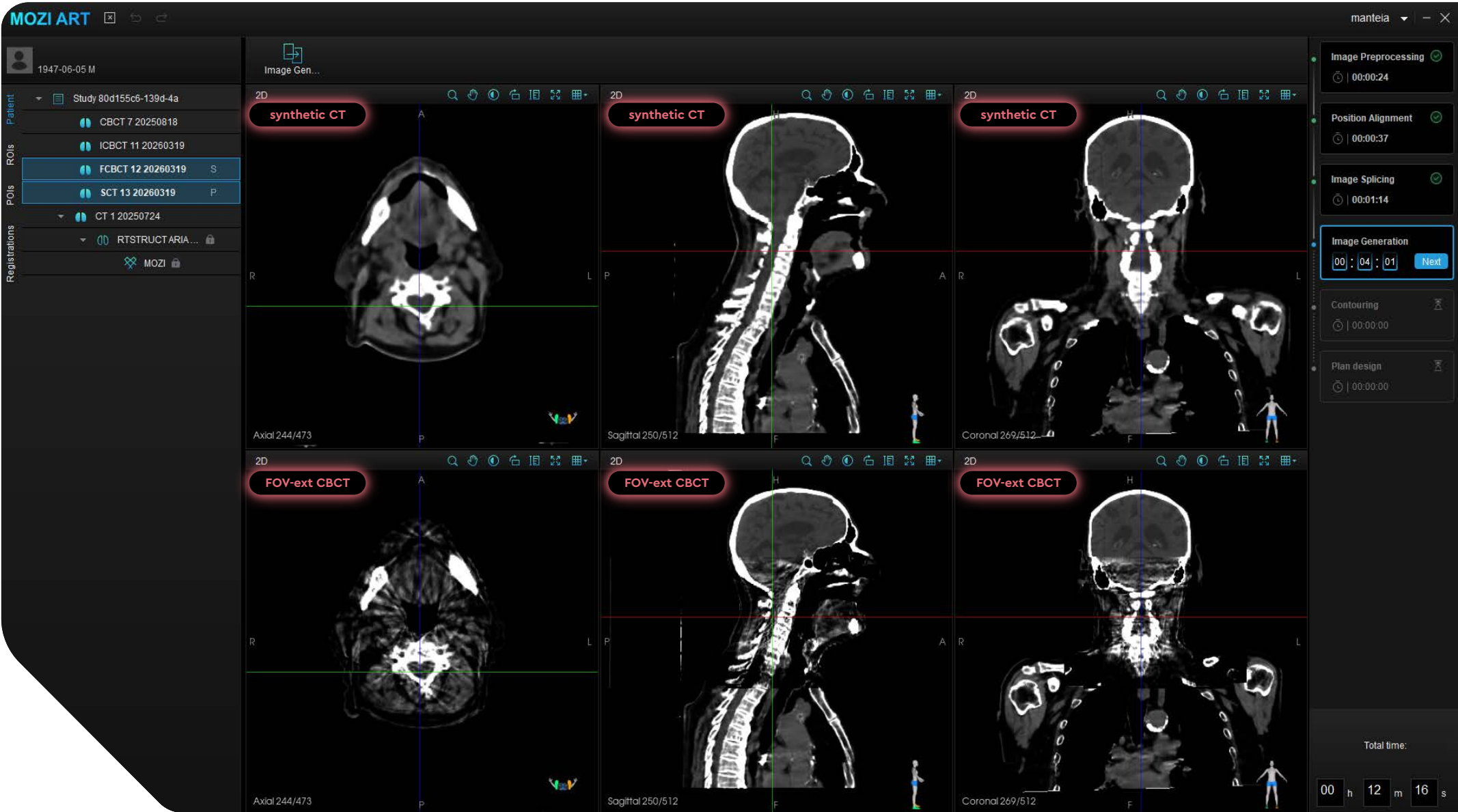
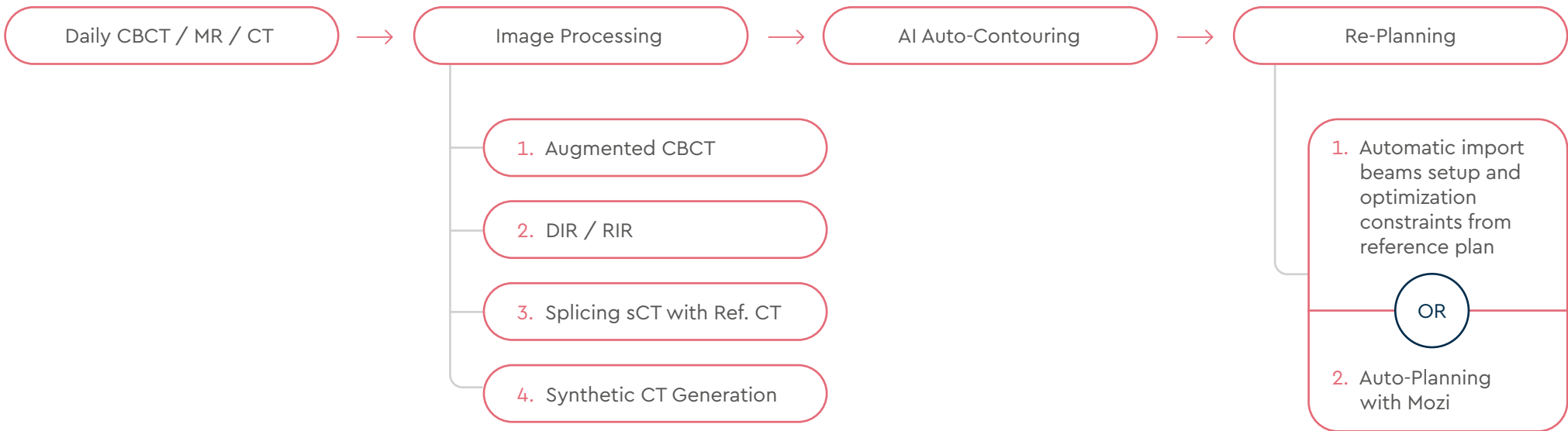
One-click Rapid QA in sec

Offers fully integration with most available solutions for on-line QA



The ON-LINE Adaptive Solution

Step 1 – Re-Plan on Daily Images

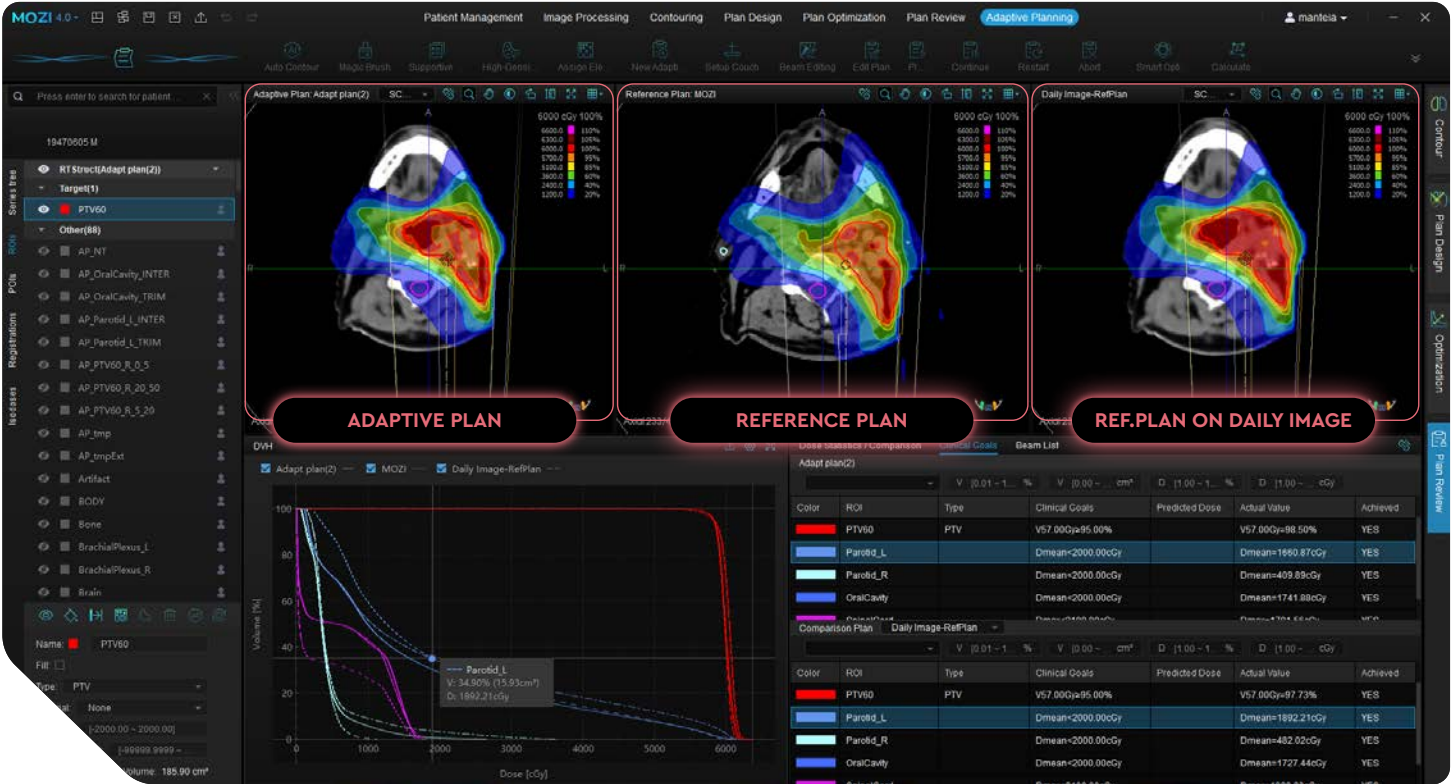


- A variety of automated tools for fast replanning
- Technologies: 3DCRT, IMRT, VMRT SBRT/SRT, SFRT
- Accurate and efficient Monte Carlo dose calculation engine (Replan within 5min)

The ON-LINE Adaptive Solution

Plan Choose:

- Adaptive Plan: Based on the patient's daily image, the adaptive plan is generated after re contouring, dose calculation and optimization
- Reference Plan: Offline Plan
- Daily Image Reference Plan: Based on the patient's daily image and contour, use the beam of the reference plan to calculate the dose again to obtain the 3D dose distribution

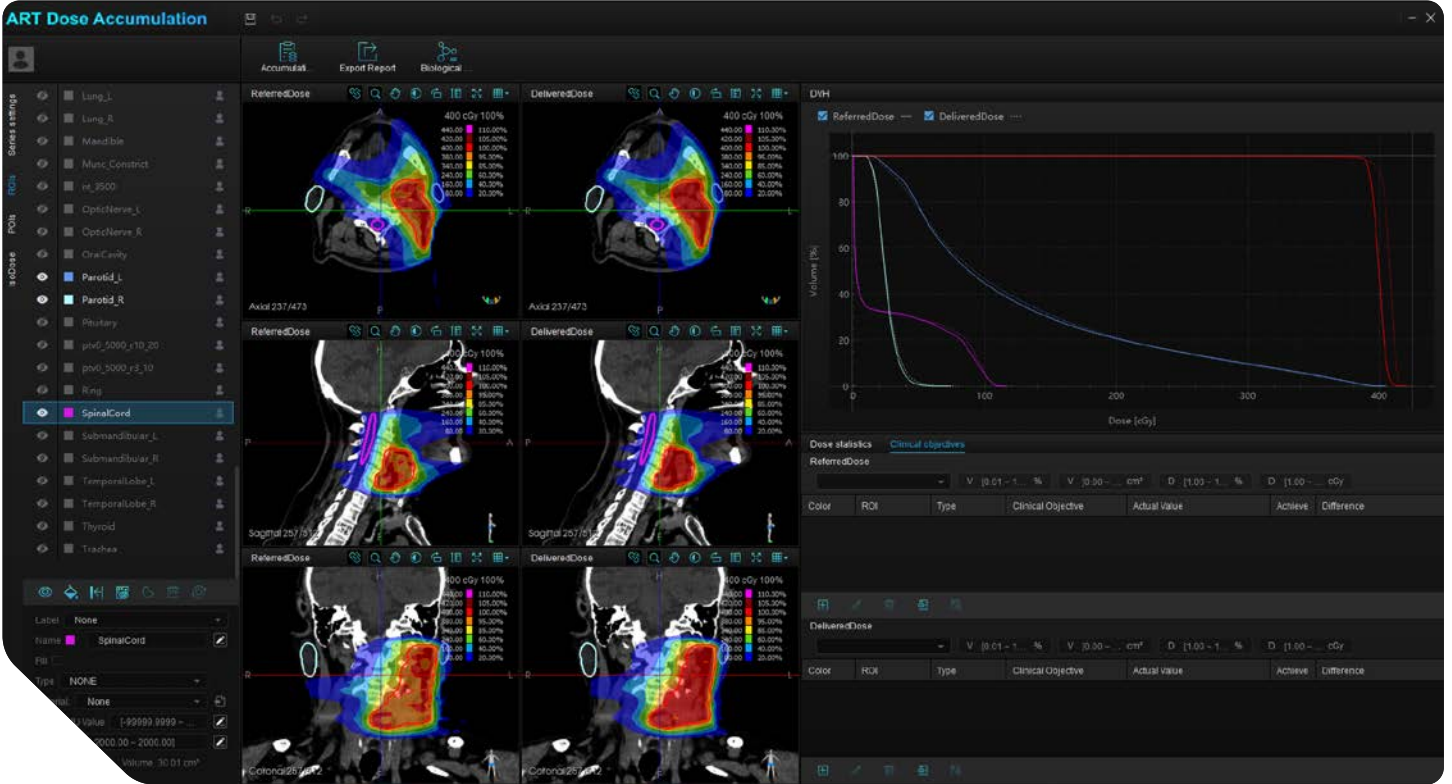


Step 2 – Treatment

Step 3 – Dose Tracking

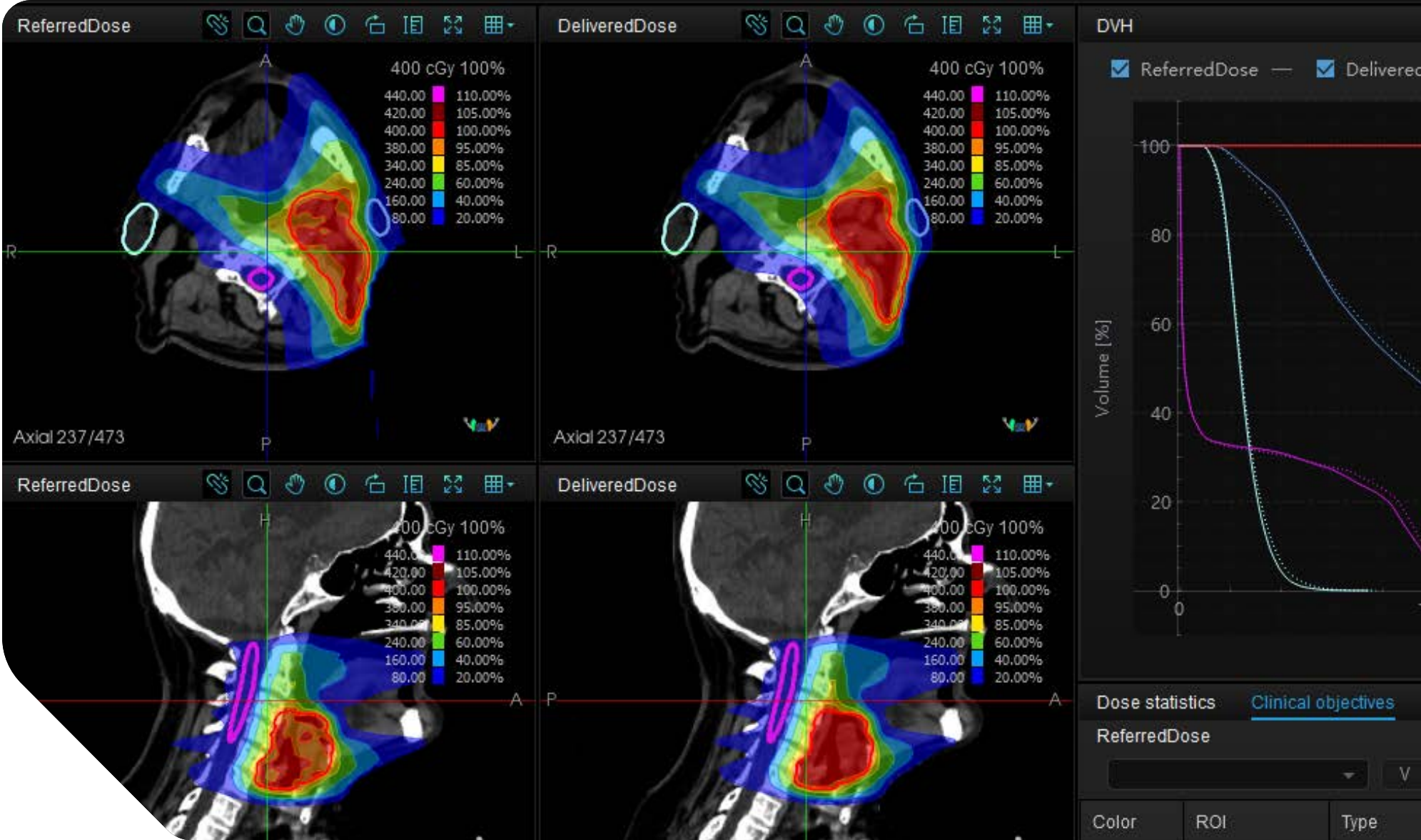
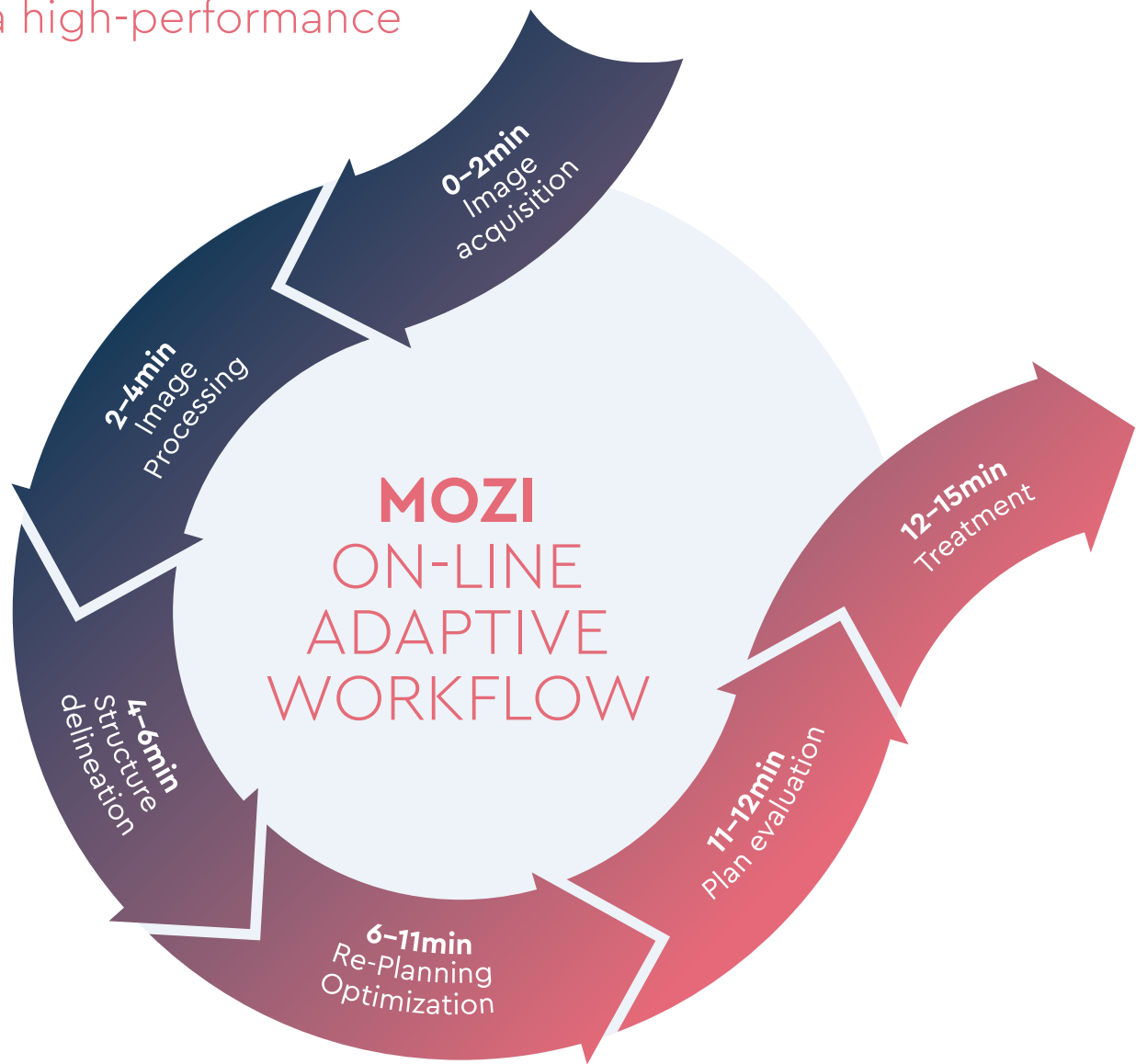
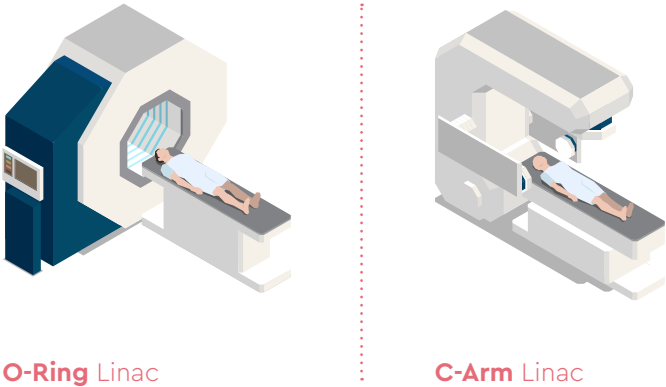
ART Dose Accumulation

- After the plan is delivered, deform the dose of the hood back to the positioning CT for dose superposition
- Evaluate target and organs



The ON-LINE Adaptive Solution

MOZI effectively transforms any standard Linac —both C-Arm and O-Ring— into a high-performance Online Adaptive system.



QA Integration

Mozi features seamlessly integrated, built-in capabilities for Online Adaptive decision-making, contour QA, secondary dose check powered by a third-party Monte Carlo engine and log file-based delivery QA.

Adaptive Check

Adaptive Check in Mozi enables rapid Online Adaptive decision-making based on daily images. Automated evaluation with predefined triggers, combined with one min dose re-calculation on sCT, assesses target coverage and OAR sparing against the reference plan. Automatically triggers re-planning based on configurable clinical criteria.

Secondary Dose Check by independent Monte Carlo

Mozi utilizes an independent Monte Carlo engine to provide fast, accurate, and unbiased secondary dose verification for both offline and adaptive plans. With each calculation completed in one minute, it enhances both efficiency and confidence in plan validation.

Delivered Dose Tracking by Logfile / EPID

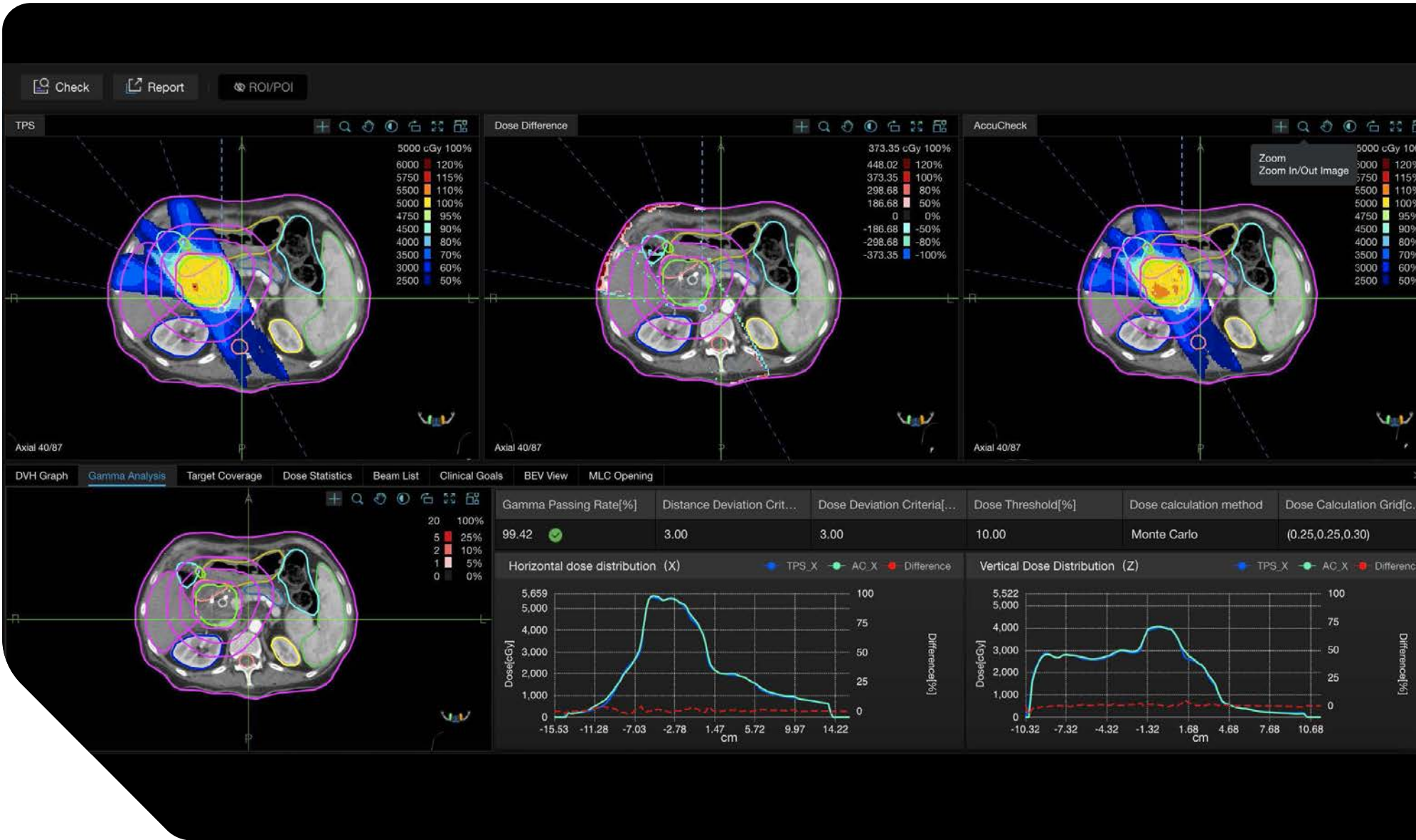
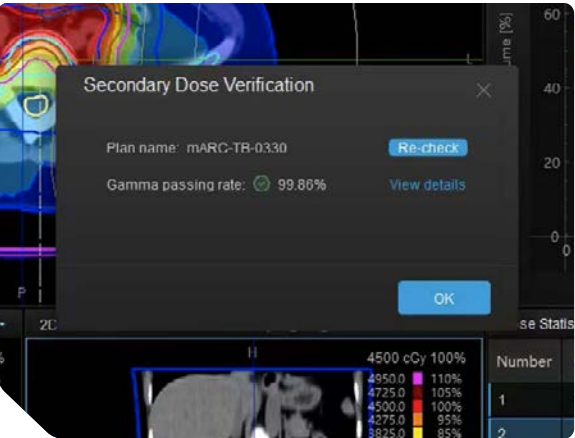
Mozi reconstructs the actual delivered dose using machine logfiles and compares it with the planned dose. With fast calculation completed in approximately one minute, it detects intra-fraction deviations and potential delivery errors, enhancing confidence in treatment accuracy.

QA Plan Generation

The QA Plan feature in Mozi enables fast and accurate verification of clinical plans by converting them into deliverable QA plans with one click. It standardizes key parameters such as angles, isocenter, and dose grid, simplifying QA setup and improving efficiency.

Seamless Integration

Mozi enables one-click QA directly from plan review within the interface, seamlessly invoking QA dose engine without data transfer. Gamma passing rates and verification results are displayed instantly within Mozi for efficient evaluation.



Compatibility and Commissioning

Compatibility

As a third-party treatment planning system, Mozi is compatible with all currently available linear accelerators worldwide, accommodating diverse treatment machines and numerous radiotherapy software systems. Achieving optimal treatment quality and efficiency requires careful orchestration across various elements. Mozi primary focus is a seamless connectivity environment among the multiple software applications and modalities and the treatment unit. Our goal is to support a wide spectrum of treatment technologies, enhancing a fully efficient treatment planning process.

Commissioning

A specialized graphical user interface is provided for photon, electron and proton beam modeling. This tool enables the model creation, assessment and commissioning of a treatment machine.



Manufacturer
Manteia Technologies Co., Ltd.
30F, No.5 Huizhan North Road,
Xiamen City, Fujian Province,
361008, P.R. China.



Customer Support – Europe
Tema Sinergie SpA
Via Malpighi, 120
48018 Faenza (RA) – Italy
Tel. +39 0546 622 663
E-mail: support-tps@temasinergie.com



CE REP
Emergo Europe B.V.
Westervoortsedijk 60, 6827 AT
Arnhem, Netherlands

CE
Reg. UE 2017/745



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