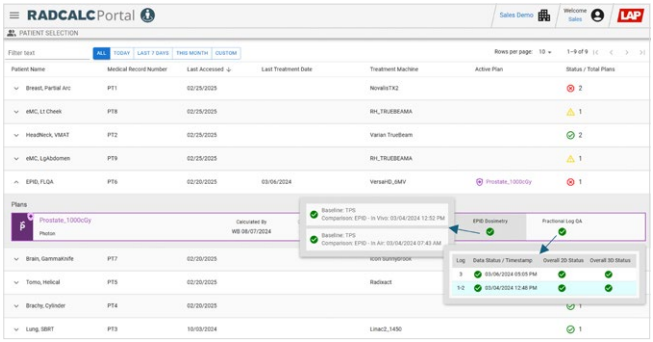
EN

RadCalc Delivery QA

Efficiency and Confidence

RadCalc's comprehensive Delivery QA package brings significant benefits in time and resource savings, dose comparison accuracy, and workflow efficiency compared to traditional phantom-based methods. RadCalc performs a Secondary Dose Check (SDC), reconstructs the treatment delivery utilizing the delivery log files from Varian and Elekta linacs, and computes the delivered true composite absolute dose using EPID dosimetry for both pre-treatment QA and in-vivo dosimetry.

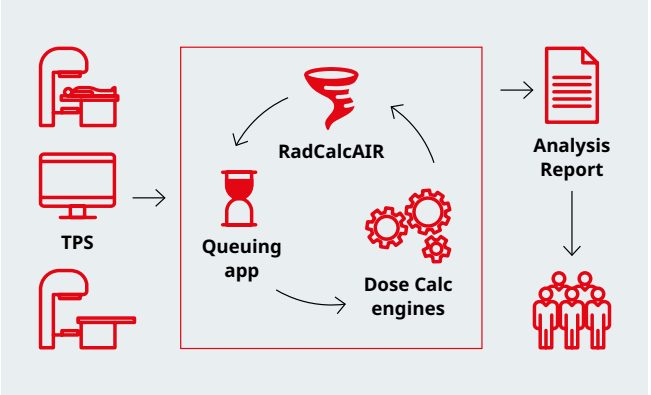


Features

- **Eliminates phantom setup and calibration with automated and seamless workflow**
  Minimizes manual interventions removing the need for time-consuming phantom alignment, calibration, and setup with treatment log file or EPID-based approaches.
- **True 3D composite EPID dosimetry for patient-centric quality**
  Truly independent volumetric dose comparisons reconstructed directly on patient's actual anatomy and not on surrogate geometric phantom models.
- **Seamless integration with absolute in-vivo dosimetry**
  RadCalc's unique EPID dosimetry feature integrates smoothly with in-vivo dosimetry workflows, using images transmitted through the patient to precisely calculate the incident fluence [1].
- **Treatment monitoring and fractional log QA (FLQA)**
  RadCalc continuously monitors treatment delivery, offering beam-to-beam planned fluence versus delivered fluence comparison. FLQA improves overall workflow efficiency by providing ongoing treatment assessment without the need for frequent interruptions, enabling proactive error detection.
- **Advanced calculations**
  RadCalc's 3D solution employs recognized algorithms ensuring confidence and precision for even the most challenging clinical cases delivering accuracy within ±3 % when compared to measurements [2,3,4].
- **Enhanced decision support for adaptive workflows**
  Results from RadCalc's processes provide clinicians with offline adaptive decision support with information to make adaptive therapy decisions based on real-time comparisons.

Portal workflows

- **SDC only workflow**
  Users evaluate the results of the SDC performed via RadCalcAIR and review the results within the RadCalc Portal. Additionally, users can compare the RadCalc 3D volumetric calculation using Gamma analysis, DVH protocols, dose analysis for points (0D) and lines (1D).
- **Log file QA workflow**
  The SDC workflow is supplemented with the evaluation of treatment delivery log file reconstruction performed by RadCalcAIR for both 3D and 2D analysis and can be reviewed in the RadCalc Portal.
- **Pre-treatment EPID dosimetry workflow**
  The SDC workflow is supplemented with the evaluation of in-air EPID dosimetry computed by RadCalcAIR and reviewed in the RadCalc Portal.
- **In-vivo EPID dosimetry workflow**
  The SDC workflow is supplemented with the evaluation of in-vivo dosimetry computed by RadCalcAIR and reviewed in the RadCalc Portal.
- **Pre-treatment and in-vivo EPID dosimetry workflow**
  The SDC workflow is supplemented with the evaluation of both in-vivo and in-air EPID dosimetry.
- **Full treatment delivery QA workflow**
  The SDC workflow is supplemented with the evaluation of both the EPID dosimetry workflows and the log file QA workflow.



[1] Efficient Data Flow in RadCalc: Unraveling the Dynamics of 3D Dose Calculation [2] RadCalc Classic: The Original Comprehensive Secondary Dose Calculation Software for Radiation Therapy [3] RadCalc's 3D Monte Carlo and 3D Collapse Cone algorithms [4] RadCalc's EPID Dosimetry: Exit-Transit Dose Reconstruction Option first developed with Dosimetry Check

Simply Precise

Components

Included modules

- **RadCalc base**
  The core module of RadCalc performs all calculation verifications, ensuring accurate Secondary Dose Checks for radiation therapy treatments. This module enable the use of TeleTherapy devices such as Cobalt, C-arm linacs, CyberKnife®, MR-Linacs and Halcyon®.
- **Treatment plan (RTP) import**
  This module allows for the seamless import of treatment plans directly from the primary treatment planning system, eliminating the need for manual data entry and reducing the potential for errors.
- **Verify and record export**
  RadCalc can export the verified radiation treatment plan to the Record and Verify (R&V) system, streamlining the workflow and ensuring consistency in treatment documentation.
- **IMRT module**
  This module verifies calculations for Intensity-Modulated Radiation Therapy (IMRT) treatments, ensuring precision in complex dose distributions and enhancing the accuracy of treatment delivery.
- **Regions of interest for 3D geometry**
  By importing regions of interest from the planning system via DICOM RT or Pinnacle, this module computes depths and effective depths to points of calculation, enhancing dose accuracy and ensuring precise treatment delivery.
- **Electron Monte Carlo (eMC)**
  3D fast electron Monte Carlo Module – RadCalc, using EGSnrc/BEAMnrc, precomputes particle track tables, used to perform a 3D dose calculation for electron treatment plans with Monte Carlo methods. The computed dose volume is received back and 3D analysis tools are used to compare against the treatment planning system.
- **3D fast Monte Carlo photon Module**
  RadCalc, using EGSnrc/BEAMnrc, precomputes particle track tables, used to perform a 3D dose calculation for photon treatment plans with Monte Carlo methods. The computed dose volume is received back and 3D analysis tools are used to compare against the treatment planning system.
- **3D Dose Collapsed Cone Module**
  RadCalc provides interoperability with DosimetryCheck dose engine to perform 3D dose calculation using either the collapsed cone or pencil beam algorithm. Computed dose volume processed and visualized in RadCalc with 3D analysis tools to compare against the TPS dose.
- **EPID Module**
  RadCalc processes EPID images by converting them to calibrated relative monitor units to be used with the DosimetryCheck dose engine where the scatter effects from the patient and the EPID are removed in order to convert them to incident fluences so they can be used to produce a 3D dose computation using the desired algorithm (only CC or PB available for EPID). Additionally, data from fractional log files can be convereted into incident fluences as well to be used for 3D dose computation using the desired algorithm.

Optional modules

- **Brachytherapy module**
  RadCalc performs independent dose verification calculations for brachytherapy treatments, supporting HDR, LDR, and permanent implants. It includes tools for 3D dose and Dose Volume Histogram (DVH) analysis, providing comprehensive verification.
- **TomoTherapy® module**
  RadCalc supports TomoHelical, TomoDirect™ and TomoEDGE™ and verifies the treatment time and dose to multiple calculation points. RadCalc can provide interoperability with the BEAMnrc/DOSExyz application by sending it plans so that it can perform a 3D dose calculation using the Monte Carlo algorithm. The computed dose volume is received back and 3D analysis tools are used to compare against the treatment planning system.
- **Gamma Knife® module**
  RadCalc performs point dose verification calculations for various Gamma Knife® versions and the Leksell GammaPlan® (LGP) planning system.

Requirements

General hardware requirements for RadCalc (main program)

	Network install	Local install – not recommended
Operating System	Microsoft® Windows® Server 2016, 2019 or 2022	Microsoft® Windows® 10, and 11, 32-bit and 64-bit operating systems
Processor	8 Core or better	8 Core or better
RAM	16 GB or more	
Network	5 Gbps connection, bandwidth to the client should be 10 mbps with a latency not exceeding 50 ms	
Video	Minimum resolution 1024 × 768 px (scaling up to 125 %) and minimum 1 GB video memory (RAM)	
Graphics	OpenGL 1.1 support required	OpenGL 1.1 support required
Hard drive space	1TB SSD available, varies with quantity and type of patient data	512 GB available, varies with quantity and type of patient data

Dedicated RadCalc external calculation engine hardware

	Collapsed Cone Dose Engine	Monte Carlo Dose Engine	Fast Monte Carlo (Photon and Electron) Dose Engine
Operating System	Windows 64-Bit OS (10,11, Server 2012, 2016, 2019 or 2022)	Windows 64-Bit OS (10,11, Server 2016, 2019 or 2022)	Windows 64-Bit OS (10,11, Server 2016, 2019 or 2022)
GPU	NVIDIA GeForce RTX 2080 Ti, or similar (must be NVIDIA)		NVIDIA GeForce RTX 3080 Ti, or similar (must be NVIDIA with 12 GB or more)
CPU	Intel Core i7-9700, 8 Core, 12 MB cache, or better	Dual Intel Xeon Gold 5220, 2.2 GHz, 3.9 GHz Turbo, 18 Core, or better	Intel Core i7-9700, 8 Core, 12 MB cache, or better
RAM	16 GB or more	64 GB or more	32 GB or more
Disk	512 GB SSD or more	512 GB SSD or more	512 GB SSD or more

Contact us!

LifeLine Software, Inc.
102 N College Ave Ste 1014
75702-7287 Tyler, TX
United States of America
P +1 903 207 4298
E sales.radcalc@lap-laser.com

www.radcalc.com