ORTEC®

AMETEK®

# LabVision 4.1

Counting Laboratory
Spectrometry Management Software

## Automation, Oversight and Analytical Accuracy for Modern Gamma Spectrometry Laboratories


- Centralized Management Panel for complete control of detectors, calibration sources, analysis libraries, sample containers, and materials.
- Unified workflow for analysis, calibrations, and QA using predefined Parameter Sets.
- Seamless integration of GammaVision's analysis engines with the new Monte Carlo algorithm tRAYcy.
- Virtual detector simulation with tRAYcy for training, method development, and realistic spectrum generation.
- Advanced Peak Editor for manual peak fitting and deconvolution.
- Comprehensive user management and audit trail to ensure full traceability and compliance with cGMP standards.
- Support for scintillators using ROI-based gamma analysis for simplified workflows.
- Built-in QA routines to monitor detector performance with customizable thresholds and trend charts.

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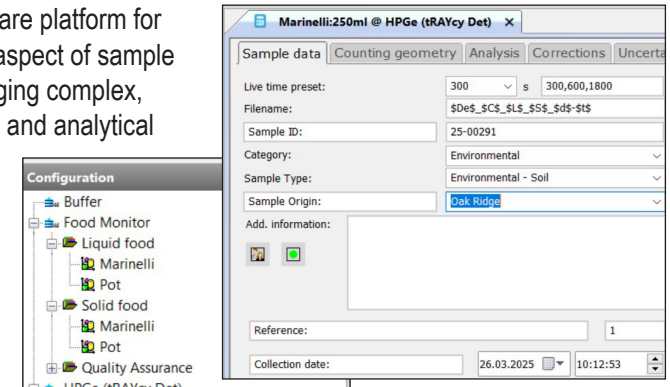
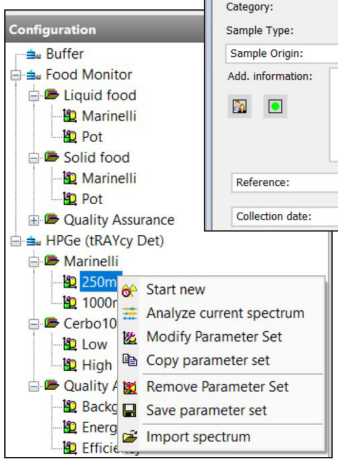
## Spectrometry Management Software

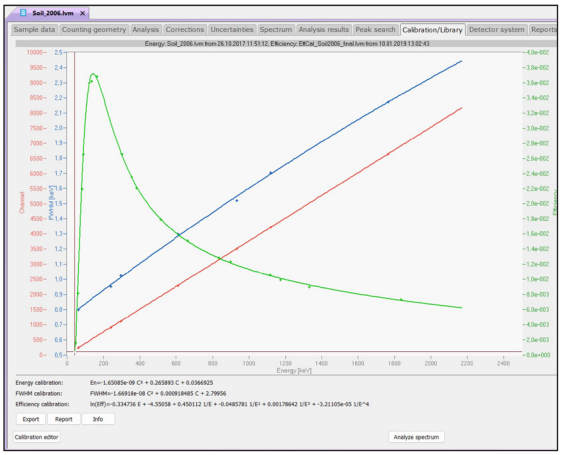
LabVision, also known by its short name LVis, is a comprehensive software platform for nuclear spectrometry laboratories, designed to unify and simplify every aspect of sample analysis. From single-detector setups to high-throughput facilities managing complex, multi-detector workflows, LabVision delivers the automation, traceability, and analytical power needed to operate with confidence.

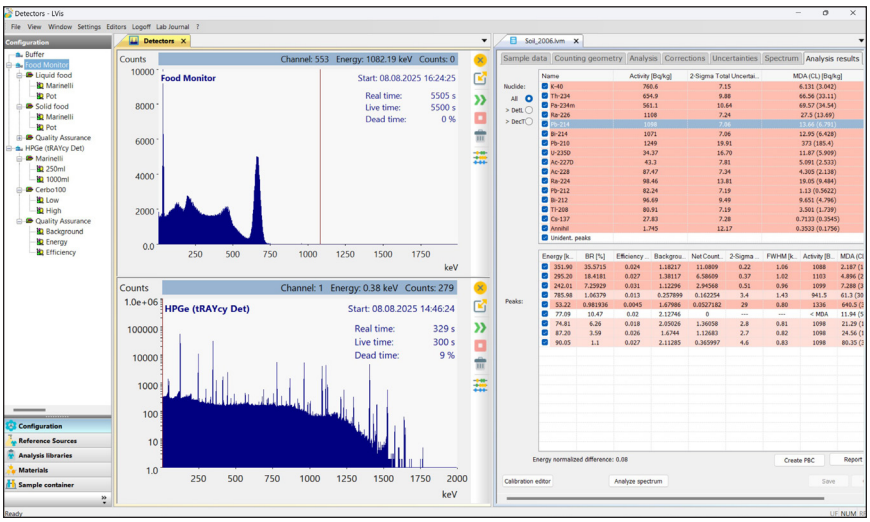
With the integration of GammaVision's proven analysis engines and ORTEC's new Monte Carlo algorithm tRAYcy directly into the software, LabVision marks a significant milestone, offering a comprehensive environment for both routine and advanced nuclear analyses.

LabVision gives laboratories more than just software — it provides a trusted partner in precision, performance, and regulatory excellence.






## Why LABVISION?

| | |
|---|---|
| **Efficient Workflow** | • All core operations — sample analysis, calibrations, and QA — follow the same structured routine format<br>• The Management Panel centralizes control of detectors, sources, libraries, containers and materials<br>• Technicians can perform tasks with minimal training, thanks to supervisor-defined parameters |
| **Advanced Analysis** | • LabVision combines GammaVision's analysis engines with the new Monte Carlo algorithm tRAYcy<br>• Users can simulate complete detector systems, including spectrum acquisition and analysis<br>• The new Peak Editor gives experts full manual control of peak fitting and deconvolution |
| **Trusted Compliance** | • Built-in QA routines monitor detector performance over time to ensure long-term reliability<br>• Full audit trail and user access control support cGMP operations<br>• Measurement files store all relevant data, ensuring full traceability, reproducibility and defensibility of results |

### Unified Workflow for All Operations

Whether analyzing samples, performing calibrations, or running QA checks, LabVision uses the same intuitive, routine-based structure. Supervisors define the parameters and technicians simply follow predefined steps, ensuring consistency, reducing training needs, and minimizing errors.

### Centralized Laboratory Control

A convenient Management Panel gives supervisors full oversight of detectors, calibrations, sample and QA routines, analysis libraries, sample containers and reference sources — all from a single, unified interface.

### Traceable and Compliant Data Handling

Every measurement file captures the raw spectrum, parameters, results, and metadata. Combined with user management and audit trail features, LabVision reliably supports cGMP-compliant procedures and regulatory inspections.

## ONE PLATFORM. ONE WORKFLOW. TOTAL CONFIDENCE.

### Reliable Quality Assurance

LabVision's built-in QA system tracks detector performance over time, visualizes trends, enforces custom thresholds, and ensures only validated systems are used, supporting consistent, compliant, and high-quality measurements.

### Optimized Spectrometry for Scintillators

LabVision goes beyond HPGe setups by supporting ROI-based gamma-ray analysis for inorganic scintillator systems. Adapted to multiple detector types without added complexity.

### Confidence Through Advanced Analysis

LabVision combines GammaVision's proven analysis engines with ORTEC's new Monte Carlo algorithm tRAYcy, to deliver accurate, defendable results. The best part? It all happens behind the scenes.Once enabled, tRAYcy runs automatically during spectrum analysis, with no manual steps required.

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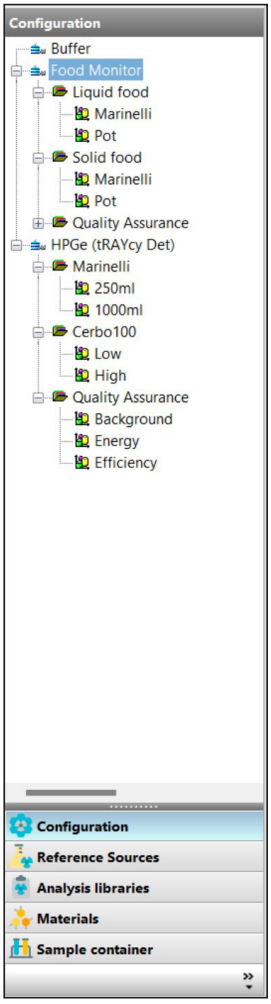
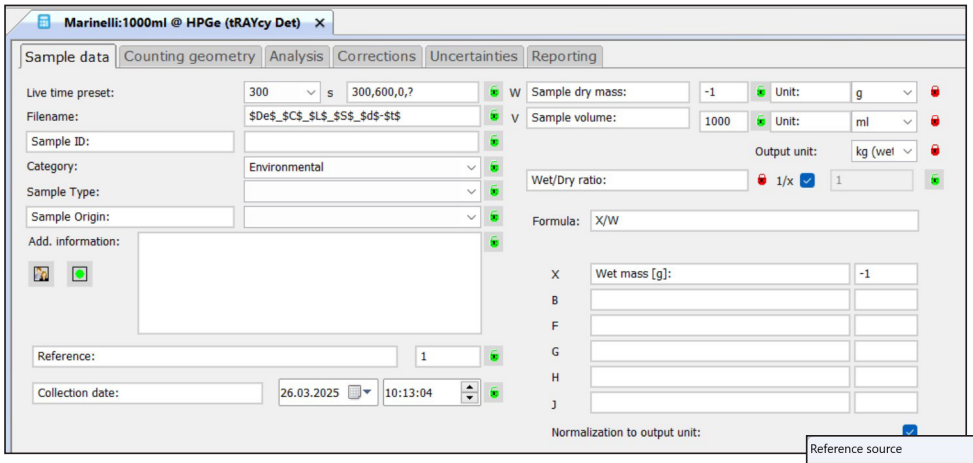
## Structured Laboratory Management

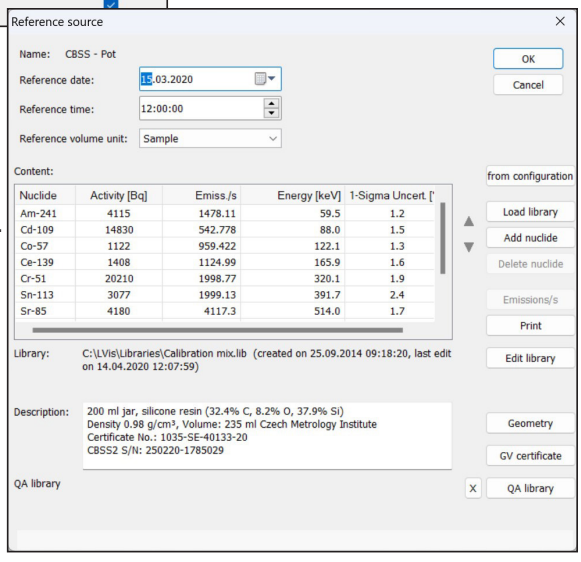
LabVision's Management Panel is the central workspace for configuring and supervising all aspects of laboratory operations. It is divided into five dedicated sections: Configuration, Reference Sources, Analysis Libraries, Materials and Sample Containers — each designed to manage a specific set of resources.




In the Configuration section, users can view and manage all detectors connected to LabVision. Each detector includes a dedicated configuration menu that provides access to electronics settings, geometry definitions, calibrations, and system health monitoring. Detectors are associated with parameter sets, which represent the laboratory's counting routines. These routines usually correspond to specific sample types that share common characteristics, such as container geometry, material composition, or analysis parameters.

Laboratory supervisors configure the parameter sets to reflect the procedures established for each routine. Each parameter set contains all relevant information for handling a given class of samples — including acquisition presets, analysis parameters, correction settings, and reporting templates. Within a parameter set, individual fields can be marked as editable or locked by the supervisor, allowing technicians to enter only the necessary sample-specific data while preserving the integrity of critical settings. This structure ensures consistency across measurements, reduces training time, and supports compliance with laboratory protocols and regulatory standards.



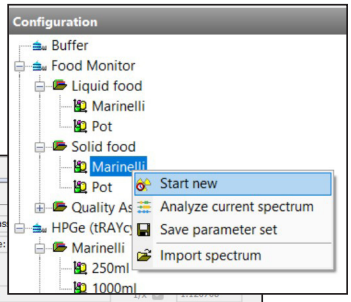




The remaining four sections provide the foundational data required to configure these routines. Reference Sources define the properties of calibration and QA sources. Analysis Libraries contain nuclide data used during spectrum analysis. Materials describe the physical and chemical properties of sample matrices. Sample Containers define the geometry of the containers used in measurements.

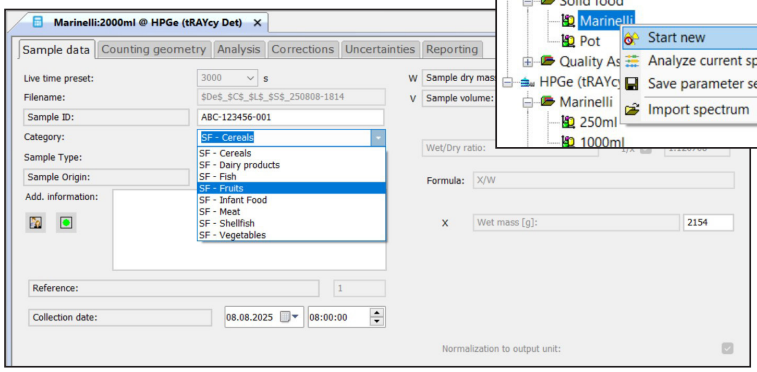
Together, these five sections form a unified environment where all components of the measurement process are centrally managed. This eliminates the need to navigate through menus or external file systems, allowing laboratory supervisors to configure, maintain, and validate their laboratory workflows entirely within LabVision quickly and intuitively.

## Streamlined Laboratory Workflow

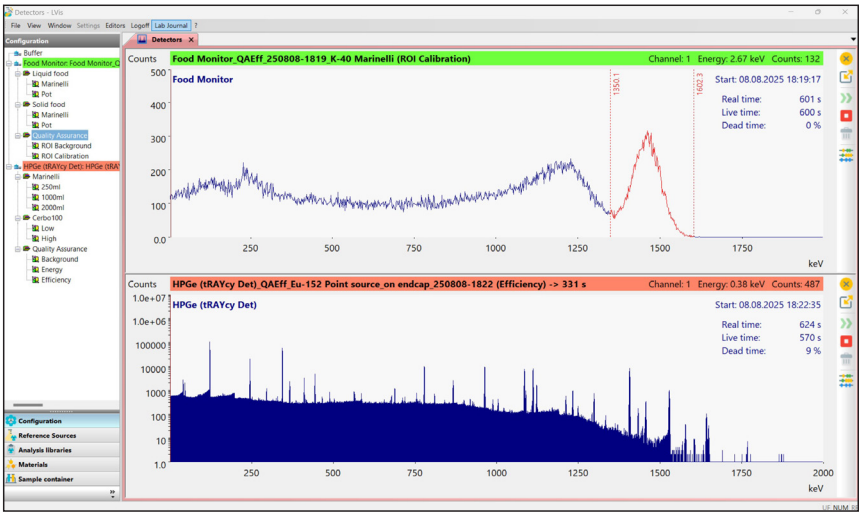
LabVision applies a unified and standardized workflow to all core measurement operations: sample analysis, detector calibrations, and quality assurance. Once the system has been configured through the Management Panel, users can perform routine tasks with minimal input and no need to adjust settings manually.




Each operation is driven by a predefined parameter set that includes all necessary acquisition and analysis settings. Users simply select the appropriate routine, enter any sample-specific details, and initiate the process. Sample information, such as collection site or measurement type, can be selected from supervisor-defined dropdown menus, reducing manual input. These fields, along with other parameters like acquisition date or detector name, can be automatically incorporated into the file naming process, creating standardized and traceable measurement filenames.

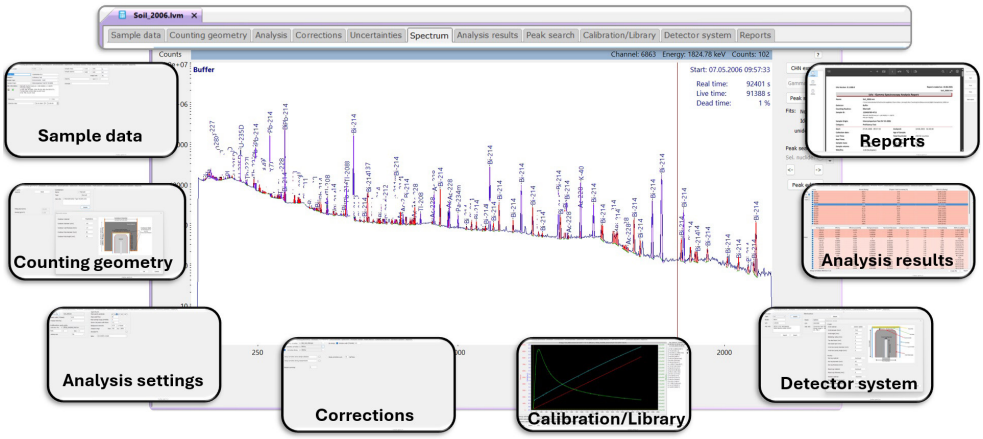



During acquisition, LabVision provides real-time feedback through the Management Panel and detector live display. Active detectors are clearly marked with status indicators, filenames, and remaining acquisition time. Depending on the parameter set configuration, the system can automatically proceed with analysis and report generation, or guide the user through a few manual steps. In both cases, all required settings are already defined, ensuring consistency and compliance.




LabVision stores each measurement as a fully self-contained file that includes the acquired spectrum and analysis results, and all relevant data such as detector configuration, calibrations, geometry definitions and analysis settings.

This level of automation reduces the potential for human error, shortens training time for new users, and supports high-throughput environments where efficiency and repeatability are essential.



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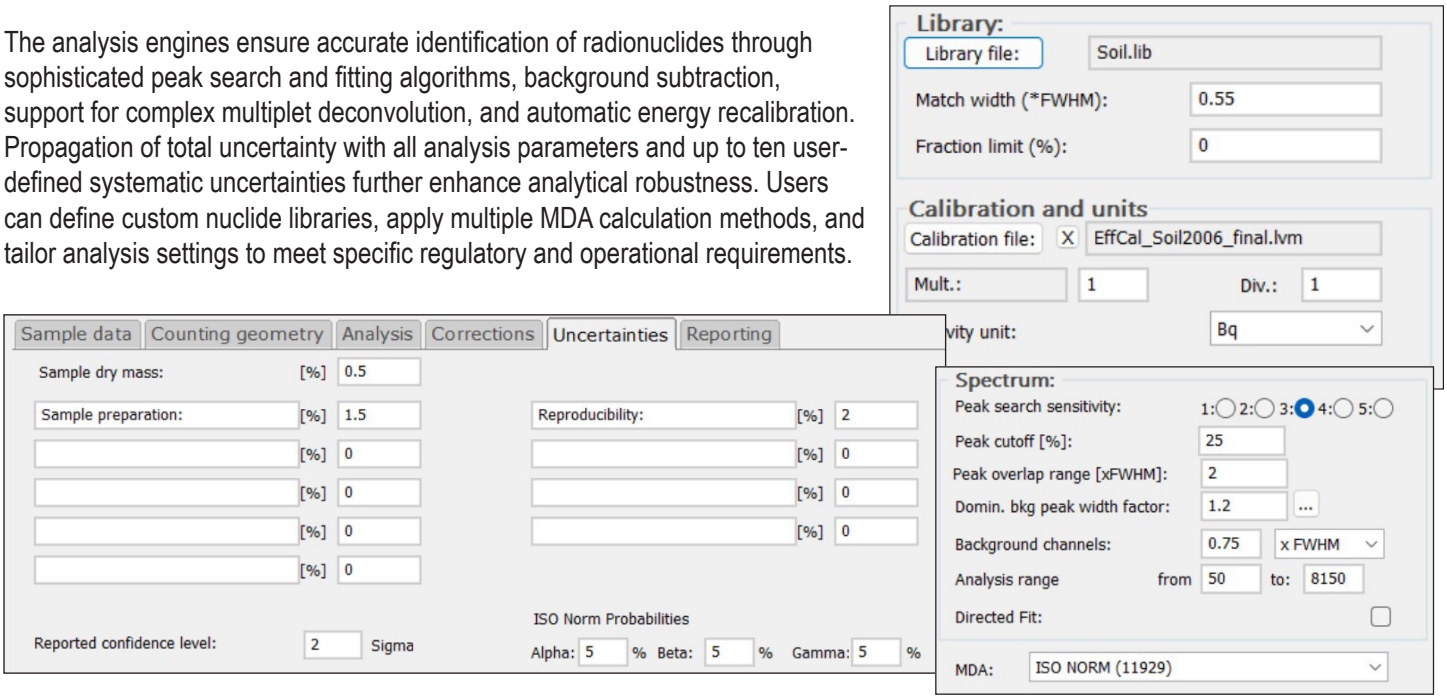
## Advanced Spectrum Analysis

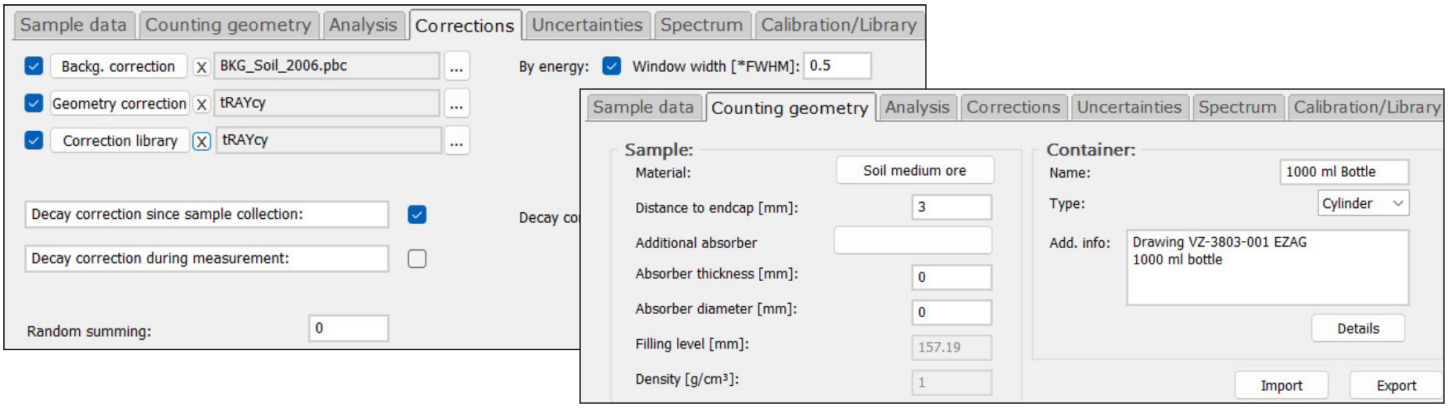
LabVision delivers comprehensive gamma spectrum analysis by combining GammaVision's trusted analysis engines with ORTEC's new Monte Carlo algorithm tRAYcy for efficiency transfer and true coincidence summing correction.

The analysis engines ensure accurate identification of radionuclides through sophisticated peak search and fitting algorithms, background subtraction, support for complex multiplet deconvolution, and automatic energy recalibration. Propagation of total uncertainty with all analysis parameters and up to ten user-defined systematic uncertainties further enhance analytical robustness. Users can define custom nuclide libraries, apply multiple MDA calculation methods, and tailor analysis settings to meet specific regulatory and operational requirements.



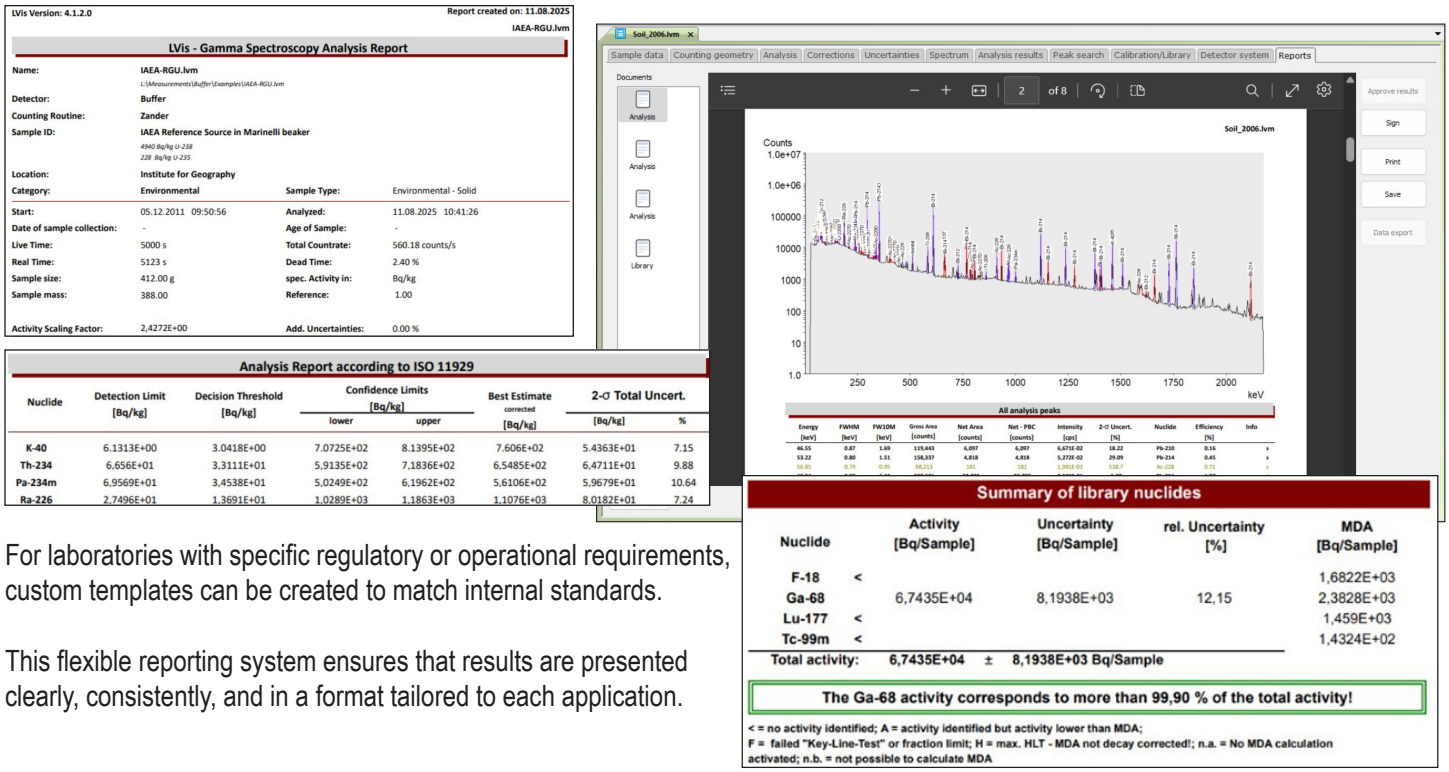

tRAYcy further enhances analytical accuracy by automatically applying efficiency transfer and true coincidence summing correction during spectrum analysis — two critical processes for accurate activity quantification. Efficiency transfer adjusts the calibration to match the geometry and composition of the measured sample, while true coincidence summing correction accounts for the loss or enhancement of counts due to simultaneous gamma emissions, ensuring precise activity determination even in complex decay schemes.

These processes happen seamlessly in the background. Once enabled, tRAYcy is automatically invoked during spectrum analysis, requiring no manual intervention. It evaluates the differences between the calibration and sample setups, and generates a geometry correction that accounts for variations in container shape, sample composition, and positioning. Its integration ensures that even complex corrections are applied consistently and reproducibly, reducing the risk of operator error and improving the reliability of results across a wide range of applications.



## Detailed and Customizable Reporting

LabVision generates analysis reports using SAP Crystal Reports templates. Several predefined templates are available for different reporting needs, from concise summaries to detailed multi-page documents. Once created, reports are saved within the measurement file where they can be reviewed, approved, digitally signed, saved as PDF files and/or directly printed.



LVis Version: 4.1.2.0 — Report created on: 11.08.2025

IAEA-RGU.lvm

**LVis - Gamma Spectroscopy Analysis Report**

| | | | |
|---|---|---|---|
| Name: | IAEA-RGU.lvm | | |
| Detector: | Buffer | | |
| Counting Routine: | Zander | | |
| Sample ID: | IAEA Reference Source in Marinelli beaker | | |
| Location: | Institute for Geography | | |
| Category: | Environmental | Sample Type: | Environmental - Solid |
| Start: | 05.12.2011 09:50:56 | Analyzed: | 11.08.2025 10:41:26 |
| Date of sample collection: | - | Age of Sample: | - |
| Live Time: | 5000 s | Total Countrate: | 560.18 counts/s |
| Real Time: | 5123 s | Dead Time: | 2.40 % |
| Sample size: | 412.00 g | spec. Activity in: | Bq/kg |
| Sample mass: | 388.00 | Reference: | 1.00 |
| Activity Scaling Factor: | 2,4272E+00 | Add. Uncertainties: | 0.00 % |

**Analysis Report according to ISO 11929**

| Nuclide | Detection Limit [Bq/kg] | Decision Threshold [Bq/kg] | Confidence Limits [Bq/kg] lower | Confidence Limits [Bq/kg] upper | Best Estimate corrected [Bq/kg] | 2-σ Total Uncert. [Bq/kg] | 2-σ Total Uncert. % |
|---|---|---|---|---|---|---|---|
| K-40 | 6.1313E+00 | 3.0418E+00 | 7.0725E+02 | 8.1395E+02 | 7.606E+02 | 5.4363E+01 | 7.15 |
| Th-234 | 6,656E+01 | 3,3111E+01 | 5,9135E+02 | 7,1836E+02 | 6,5485E+02 | 6,4711E+01 | 9.88 |
| Pa-234m | 6,9569E+01 | 3,4538E+01 | 5,0249E+02 | 6,1962E+02 | 5,6106E+02 | 5,9679E+01 | 10.64 |
| Ra-226 | 2,7496E+01 | 1,3691E+01 | 1,0289E+03 | 1,1863E+03 | 1,1076E+03 | 8,0182E+01 | 7.24 |

**Summary of library nuclides**

| Nuclide | | Activity [Bq/Sample] | Uncertainty [Bq/Sample] | rel. Uncertainty [%] | MDA [Bq/Sample] |
|---|---|---|---|---|---|
| F-18 | < | | | | 1,6822E+03 |
| Ga-68 | | 6,7435E+04 | 8,1938E+03 | 12,15 | 2,3828E+03 |
| Lu-177 | < | | | | 1,459E+03 |
| Tc-99m | < | | | | 1,4324E+02 |
| Total activity: | | 6,7435E+04 | ± 8,1938E+03 Bq/Sample | | |

The Ga-68 activity corresponds to more than 99,90 % of the total activity!

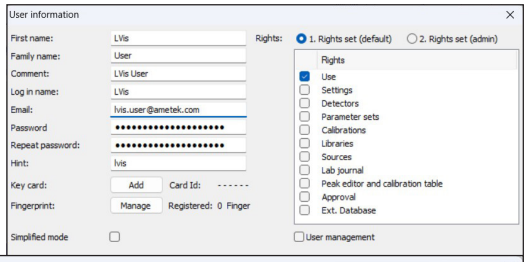
< = no activity identified; A = activity identified but activity lower than MDA;
F = failed "Key-Line-Test" or fraction limit; H = max. HLT - MDA not decay corrected!; n.a. = No MDA calculation activated; n.b. = not possible to calculate MDA

For laboratories with specific regulatory or operational requirements, custom templates can be created to match internal standards.

This flexible reporting system ensures that results are presented clearly, consistently, and in a format tailored to each application.

## Secure and Compliant Data Management

LabVision's advanced user management system allows supervisors to define roles and permissions, ensuring that only authorized personnel can access or modify critical settings and operations. Every action performed within the software is logged through a comprehensive audit trail. This level of traceability is essential for laboratories operating under current Good Manufacturing Practices (cGMP).



User information

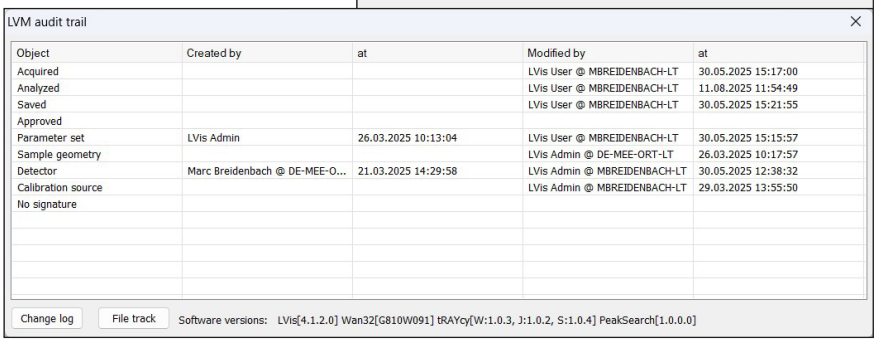
First name: LVis
Family name: User
Comment: LVis User
Log in name: LVis
Email: lvis.user@ametek.com
Password: ••••••••••••••••••
Repeat password: ••••••••••••••••••
Hint: lvis
Key card: Add Card Id: ------
Fingerprint: Manage Registered: 0 Finger
Simplified mode

Rights: 1. Rights set (default) 2. Rights set (admin)

Rights: Use, Settings, Detectors, Parameter sets, Calibrations, Libraries, Sources, Lab journal, Peak editor and calibration table, Approval, Ext. Database

User management

LabVision measurement files store the spectrum, all associated data — acquisition information, detector configuration, energy and efficiency calibrations, library, counting geometry, analysis parameters, results and reports — and a file-specific audit trail, ensuring full transparency, reproducibility and traceability of every analysis.



LVM audit trail

| Object | Created by | at | Modified by | at |
|---|---|---|---|---|
| Acquired | | | LVis User @ MBREIDENBACH-LT | 30.05.2025 15:17:00 |
| Analyzed | | | LVis User @ MBREIDENBACH-LT | 11.08.2025 11:54:49 |
| Saved | | | LVis User @ MBREIDENBACH-LT | 30.05.2025 15:21:55 |
| Approved | | | | |
| Parameter set | LVis Admin | 26.03.2025 10:13:04 | LVis User @ MBREIDENBACH-LT | 30.05.2025 15:15:57 |
| Sample geometry | | | LVis Admin @ DE-MEE-ORT-LT | 26.03.2025 10:17:57 |
| Detector | Marc Breidenbach @ DE-MEE-O... | 21.03.2025 14:29:58 | LVis Admin @ MBREIDENBACH-LT | 30.05.2025 12:38:32 |
| Calibration source | | | LVis Admin @ MBREIDENBACH-LT | 29.03.2025 13:55:50 |
| No signature | | | | |

Change log | File track | Software versions: LVis[4.1.2.0] Wan32[G810W091] tRAYcy[W:1.0.3, J:1.0.2, S:1.0.4] PeakSearch[1.0.0.0]

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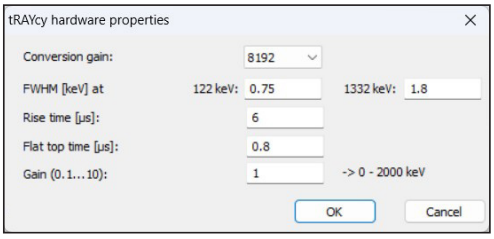
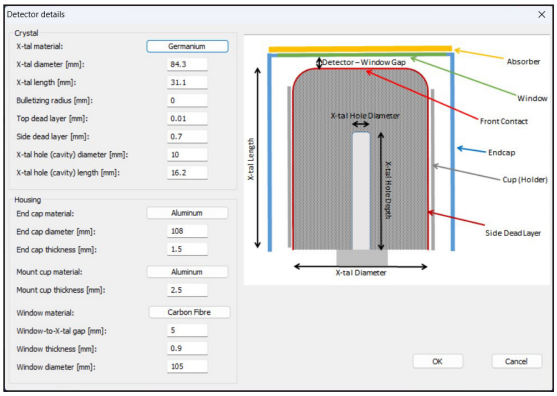
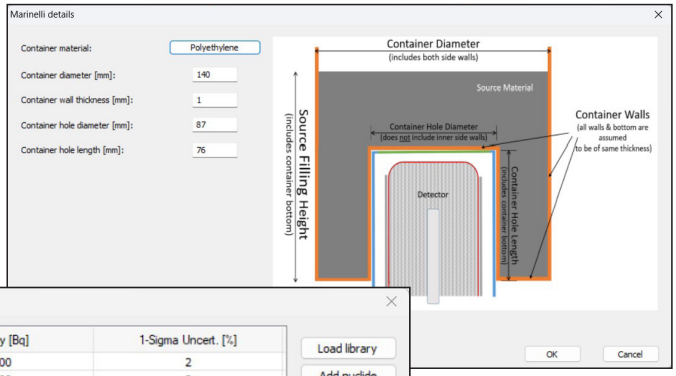
## Realistic Detector Simulation

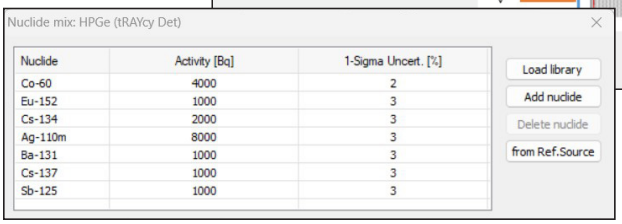
LabVision introduces a powerful feature: the ability to simulate complete detector systems using ORTEC's new Monte Carlo algorithm tRAYcy. These virtual detectors, known as tRAYcy Detectors, are configured directly within the Management Panel and behave like physical detectors throughout the software environment.




Once defined, a tRAYcy Detector can be used to simulate spectrum acquisition, perform sample analysis, and execute QA routines — just like a real detector. Users can select predefined detector models or create new ones, customize geometry and electronics settings, and simulate realistic spectra based on specific nuclide mixes and measurement routines.

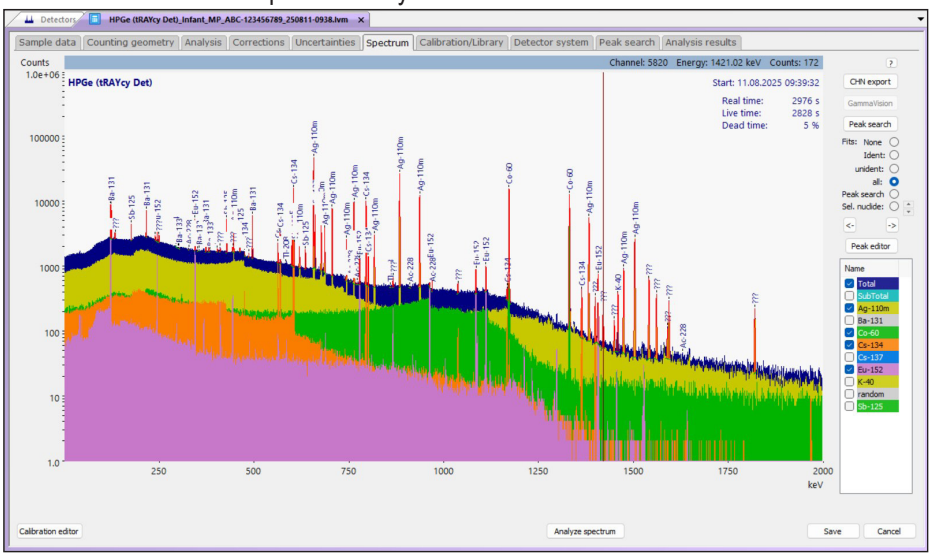


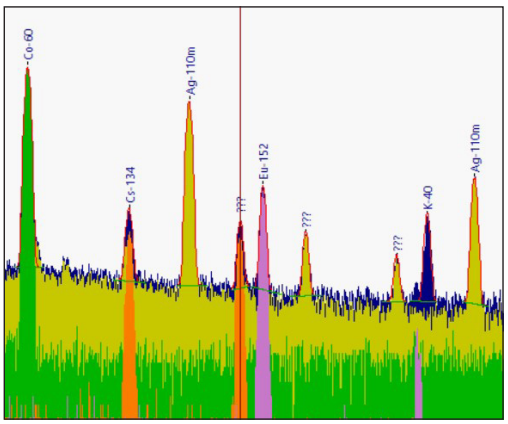




The simulated spectra include full detector responses, such as sum peaks, escape peaks, and coincidence effects, providing a highly accurate representation of real-world measurements and eliminating the ambiguity of unidentified peaks.

tRAYcy Detectors are ideal for training, method development, and validation, offering a safe and flexible environment to explore detector behaviour and optimize analysis workflows.

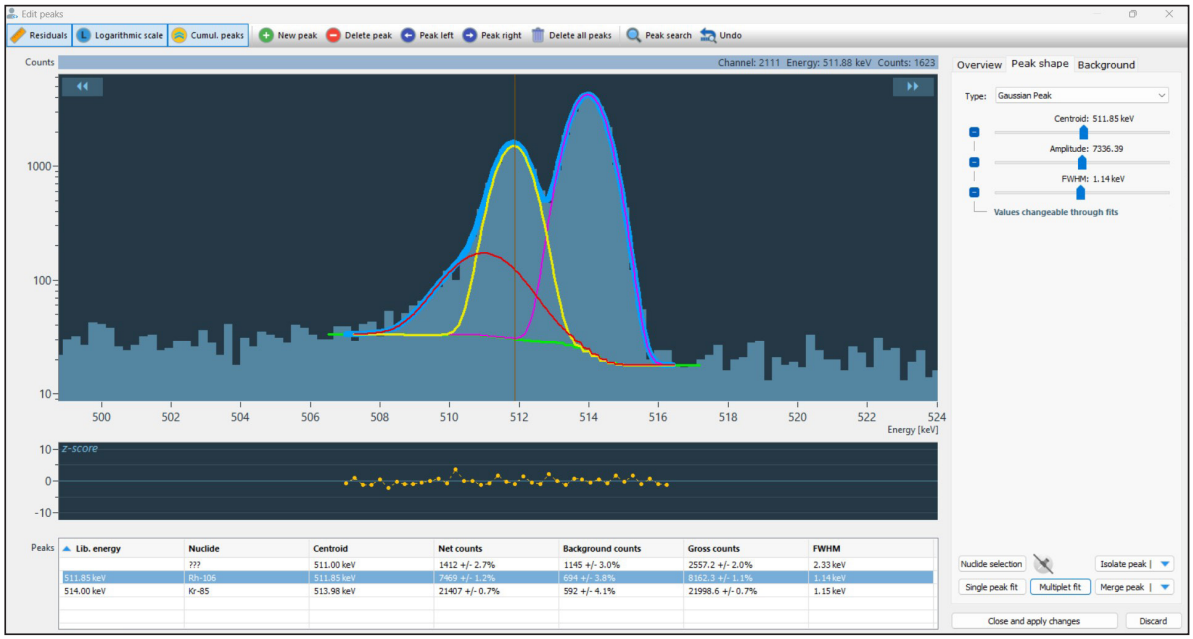


## Expert Peak Fitting

The new Peak Editor in LabVision empowers experienced users with full manual control over peak fitting operations. Through an intuitive graphical interface, users can fine-tune individual peak parameters, apply different mathematical models for both peak and background fitting, and resolve complex multiplets or overlapping peaks.

This level of control is especially valuable when analyzing low-count or high-complexity spectra, where automated routines may require refinement. Manual adjustments are seamlessly integrated with the automated analysis results, ensuring both accuracy and traceability. The Peak Editor is a powerful tool for laboratories that demand high analytical precision and defensible results in challenging measurement scenarios.




## Simplified Gamma Screening

LabVision supports ROI-based analysis for scintillation detectors such as NaI(Tl) and $LaBr_3$, enabling efficient gamma spectrometry without full peak fitting. Users can define regions of interest, link them to nuclides, and apply them across standard routines. ROI analysis follows the same unified workflow used for HPGe detectors. This approach simplifies analysis for routine applications like environmental screening or industrial monitoring, while maintaining consistency and traceability across measurements, even when using simpler detector systems.

Sample data | Counting geometry | ROIs | Corrections | Uncertainties | Spectrum | Peak search | Calibration/Library | Detector system | **ROI Results**

| Nuclide | Energy [keV] | Channels | Gross [cps] | Background [cps] | Net Count Rate [cps] | Activity [Bq/kg] | Dec. Threshold [Bq/kg] | MDA [Bq/kg] |
|---|---|---|---|---|---|---|---|---|
| Am-241 | 41.2 - 70.2 | 21 - 35 | 9.55 ± 3.74% | 9.425 ± 5.95% | 0.125 ± 531.56% | 5.76001 ± 532.07% | 21.2464 | 48.0408 |
| Cd-109 | 72.1 - 103.1 | 36 - 52 | 13.937 ± 3.09% | 13.326 ± 5.32% | 0.61056 ± 135.98% | 196.381 ± 137.93% | 187.731 | 421.585 |
| Co-57 | 107.0 - 139.9 | 54 - 71 | 13.967 ± 3.09% | 13.75 ± 5.39% | 0.21667 ± 396.02% | 2.6886 ± 396.69% | 7.5702 | 16.9005 |
| Ce-139 | 149.6 - 182.6 | 76 - 93 | 11.277 ± 3.44% | 10.99 ± 6.03% | 0.28667 ± 267.94% | 3.8742 ± 268.93% | 7.37098 | 16.4668 |
| Sn-113 | 360.3 - 427.0 | 183 - 217 | 14.957 ± 2.99% | 16.353 ± 6.90% | -1.3961 ± 86.88% | -39.2898 ± 87.99% | 26.1081 | 54.8847 |
| Cs-137 | 591.0 - 724.3 | 301 - 369 | 12.767 ± 3.23% | 5.7117 ± 16.38% | 7.055 ± 14.50% | 239.418 ± 20.11% | 26.1246 | 55.3726 |
| Y-88 | 836.3 - 955.0 | 427 - 488 | 3.7267 ± 5.98% | 3.9267 ± 18.73% | -0.2 ± 384.28% | -8.15572 ± 384.54% | 24.6732 | 51.1121 |
| Co-60 | 1092.6 - 1243.4 | 558 - 636 | 5.9933 ± 4.72% | 4.6083 ± 19.52% | 1.385 ± 68.07% | 67.7666 ± 69.49% | 36.2023 | 75.1153 |
| Co-60 | 1249.5 - 1424.0 | 639 - 729 | 4.3133 ± 5.56% | 9.2517 ± 14.78% | -4.9383 ± 28.12% | -273.817 ± 31.38% | 62.3873 | 127.389 |
| Y-88 | 1726.9 - 1943.0 | 885 - 997 | 0 ± 0.00% | 0 ± 0.00% | 0 ± 0.00% | 0 ± 1.#R% | 0 | 3.46617e-30 |

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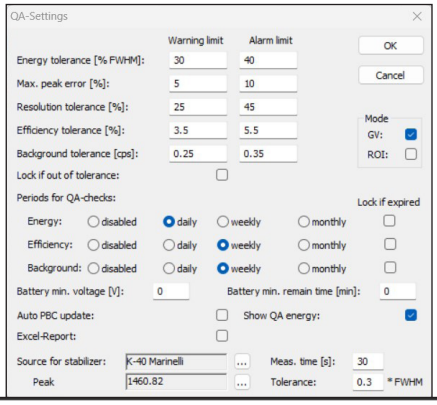
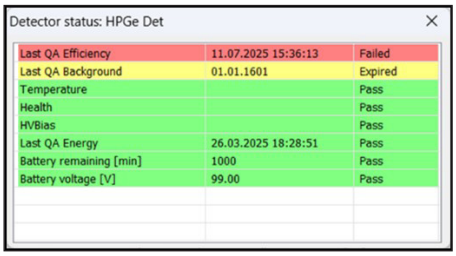
## Comprehensive Quality Assurance

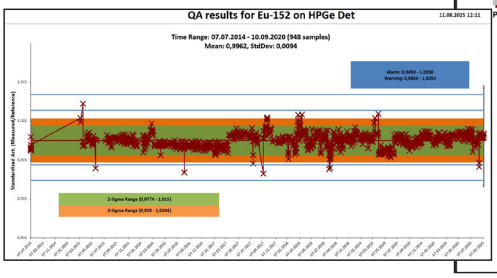
LabVision includes a built-in QA system designed to ensure long-term detector performance and measurement reliability. QA routines are detector-specific and tailored to the analysis type, whether ROI-based or full gamma analysis.

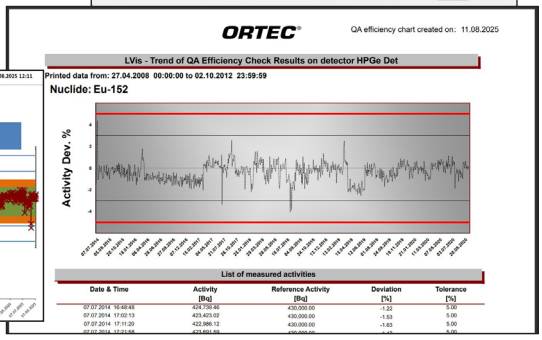
Users can configure checks for background, energy calibration, resolution, and efficiency, with customizable warning and alarm thresholds. The frequency of QA checks and required corrective actions can also be defined to meet internal standards.

All QA data is tracked over time and visualized through customizable trend charts, accessible directly from the Management Panel. These charts help identify performance drift and support proactive maintenance, using templates compatible with SAP Crystal Reports or Excel.



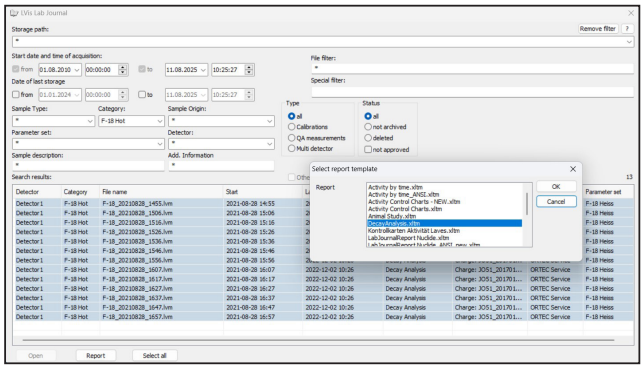



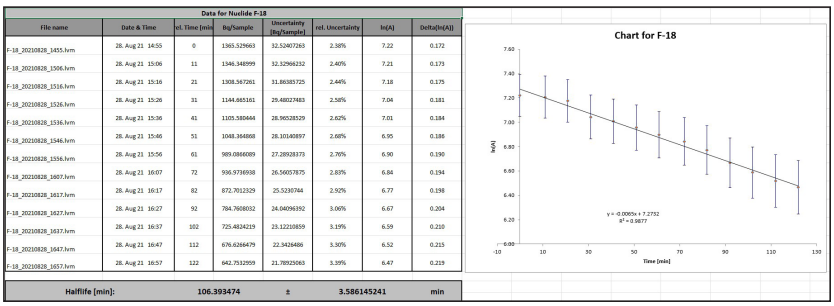

## Smart Measurement Archive

The Lab Journal provides centralized access to all measurement data across the laboratory. While each measurement file contains complete analysis results for a single acquisition, the Lab Journal combines key data from all measurements into a unified database, enabling efficient search, filtering, and reporting.



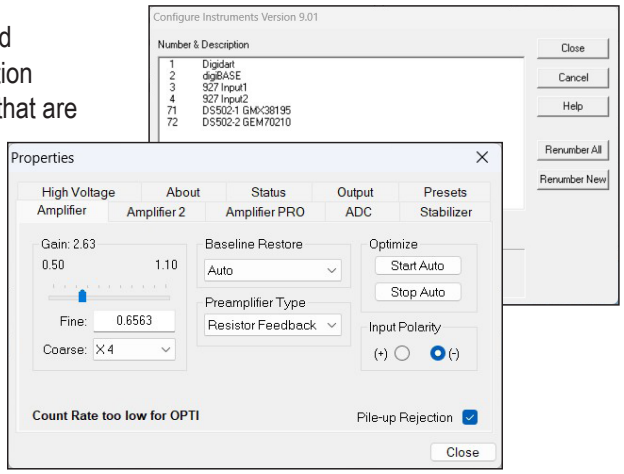

Every time a spectrum is analyzed and saved in LabVision, the Lab Journal automatically logs essential information into a dedicated database. Users can also manually import existing measurement files, allowing legacy data to be included in the journal.

Through an intuitive interface, users can filter measurements by date, detector, type, and other criteria. Results are displayed in a sortable table, with direct access to open files in LabVision or export selected data to Microsoft Excel for advanced QA analysis and trend visualization.



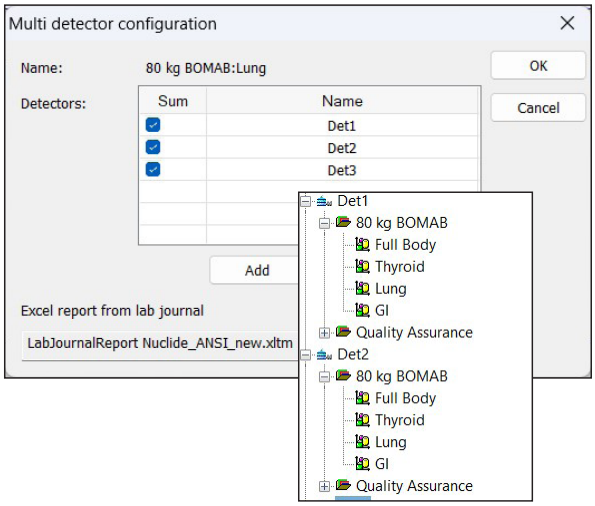
## Integrated Hardware Control

The CONNECTIONS framework provides the interface between hardware and software, supporting up to 250 detectors across a local network. This application layer encompasses all of the hardware drivers and communication protocols that are necessary for software applications to control the MCB (Multi-Channel Buffer) instruments. Hardware controls are accessed through MCB Property pages that are integrated with LabVision and other standard ORTEC applications.




Windows 11, 10, 8.1 and 7 64-bit hardware compatibility is available for all ORTEC instruments that use USB and TCP/IP connectivity. Instruments that are dependent on a host computer, such as plug-in cards or USB devices, can optionally be shared on a network through local MCB Servers allowing full control from remote locations.

LabVision also supports synchronized multi-detector acquisitions, enabling simultaneous measurements across multiple detectors using shared acquisition parameters such as measurement time, sample weight, and reference date. This is particularly useful for applications like whole-body counting.




Each detector in the configuration uses its own predefined analysis and correction parameters, ensuring that results remain detector-specific and consistent. Measurement-specific parameters are entered once, prior to acquisition, in the parameter set of the lead detector. These values are then automatically applied to all detectors in the configuration, streamlining setup and reducing the risk of input errors.

## Flexible System Integration

LabVision can support automatic sample changers, allowing users to queue multiple samples for unattended operation. Control is achieved via ORTEC hardware I/O signals (“sample ready” and “change sample”) or through software. Software-based control is available for compatible models from GEMINI Technology Ltd, Hidex, and innoRIID.

LabVision can also exchange data with Laboratory Information Management Systems (LIMS) through automated file-based communication. Users can define import and export directories for sample data and analysis results.

For implementation details and compatibility of these functionalities, please contact your local ORTEC representative.

# LabVision 4.1

Counting Laboratory
Spectrometry Management Software

## Ordering Information

| Model | Description |
|---|---|
| **LVIS-GAMMA** | LabVision Counting Laboratory Spectrometry Management Software for Windows. Includes standalone or network copy and binary use license. |
| **LVIS-GAMMA-N** | LabVision Single Use Network Copy. Requires current version of LVIS-GAMMA. |
| **LVIS-GAMMA-U** | LabVision Update from LVIS-GAMMA or LVIS-GAMMA-N to latest version of LabVision. |
| **LVIS-ROI** | LabVision Counting Laboratory Spectrometry Management Software for Windows (ROI Analysis Only Option). |
| **LVIS-ROI-N** | LabVision Single Use Network Copy (ROI Analysis Only Option). Requires current version of LVIS-ROI. |
| **LVIS-ROI-U** | LabVision Update from LVIS-ROI or LVIS-ROI-N to current version of LabVision (ROI Analysis Only Option). |

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