GammaVision® 7
High Resolution Gamma Spectroscopy Software

“Compatible, Efficient, and Defendable Results for High Resolution Spectroscopy Applications.”
GammaVision is an all-inclusive gamma spectroscopy application for high resolution spectrometer systems. It packs all of the basic and advanced features needed for accurate and consistent measurements in an intuitive interface that is easy to learn and operate. With embedded MCA controls, advanced spectrum analysis functions, automation for routine operations, quality control and security, GammaVision is universally fit for large scale production labs, nuclear power plants, research and education, automated monitoring systems, and many other applications.

### Why GammaVision?

<table>
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<tr>
<th>Compatibility</th>
<th>Processes Efficiency</th>
<th>Defendable Results</th>
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</table>
| - Operates in the most common PC Environments - Windows 7 (32 & 64 bit) and Windows XP  
- Multiple Languages: German, Chinese, French and English  
- Extensive Analysis and Detection Limit capability to accommodate a variety of applications  
- Optional Report Writer with MS Access Data Storage and Crystal Reports for Custom Reports | - Integrated Hardware control  
- Automation Scripting for Consistent measurement processes  
- Simplified Calibration using Wizards and Interactive Editors  
- Customizable Spectrum Display with “Live” update during acquisition and Detailed Peak Evaluation | - Compliance with Industry Standards such as ANSI N42.14, ANSI N13.30, and ISO/DIS 11929  
- Quality Control Reports, Trending, and optional instrument lock-out on violations  
- Security to limit access to specified functions  
- Comprehensive V&S Test Results available as an option |

### GammaVision 7 Brings a Broad Spectrum of Improvements!

**New!** 64-Bit Windows 7, German Language, and Regional Settings Compatibility  
**New!** Enhanced ISO-11929 Compatibility  
**New!** Optimization of Peak Search, Fit and Graphic Display, Library Reduction, and Cascade Summing Correction  
**New!** Nuclide Independent Peak Background Correction  
**New!** Defined Uncertainty for all standard analysis inputs and up to nine User-Defined Uncertainty parameters  
**New!** “List Mode” Time-Correlated event logging for post-acquisition interrogation with sub-second resolution  
**New!** Several additions and improvements in Job Functions to optimize Automation processes  
**New!** Energy and Efficiency Calibration Enhancements
Bringing it all together for the most Compatible, Efficient, and Defendable Results Possible!
The core purpose of GammaVision is the accurate identification and quantification of radioactive material using high resolution gamma spectroscopy. This process requires accurate system calibrations and analysis settings, robust peak search and fit algorithms, and a variety of corrections for background, peak interferences, attenuation, reporting units, and various other factors. It is also important to comply with regulations and standards for reporting measurement uncertainty and detection limits.

For accuracy, efficiency, and standards compliance, GammaVision is the right choice.

Key Analysis Features:
- Standards Compliant: ISO/DIS 11929, ANSI N42.14, ASTM E181-82
- Total Uncertainty Propagation from all Standard Inputs and up to 9 User-Defined Parameters
- Analysis Parameters: Peak Search Sensitivity, Peak Uncertainty Cutoff, Peak Match Width, Fraction Limit, Background Determination by Automatic or Fixed Number of Channels with Linear, Parabolic, or Stepped Fit
- User-Defined Nuclide Libraries with Key Line, Peak Activity, and MDA Flags
- Optionally Calculate Nuclide Activity with the Absence of Qualified Peaks
- Graphical Peak Fit and Residuals Display
- Customizable Reports
- Application Specific Analysis Engines
  - WAN32: Simple spectra with a small list of possible nuclides
  - GAM32: Simple spectra with a large list of possible nuclides
  - ROI32: WAN32 with the addition of user-defined regions of interest
  - ENV32: Complex spectra with a large list of possible nuclides
  - NPP32: Complex spectra with a small or well-characterized nuclide mix
- Peak Search Methodology
  - Library Driven Peak Location
  - Second Difference method ("Mariscotti")
  - User-Defined Region of Interest
- Analysis Corrections
  - Nuclide Dependent or Independent Background/Blank Subtraction
  - Partial or Complete Peak Overlap (Deconvolution/Peak Stripping)
  - Nuclide Decay During Collection, From Collection, and During Acquisition
  - Random and Cascade Summing
  - Gain/Energy Calibration Shift
  - Internal and External Absorption
  - Relative Geometry Extrapolation
  - Peak-Weighted Average Nuclide Activity
Calibration

An accurate calibration is essential for proper peak identification and quantification – particularly for complex spectra with closely overlapping peaks. This can be a tedious and time-consuming process with some systems, but it’s easy with GammaVision’s Calibration Wizard. Simply acquire a spectrum, load a calibration library and source certificate, and the calibration is complete!

Calibrations can also be automated as part of the routine counting or QA processes.

Key Calibration Features:

- **γ Calibration Types**
  - Channel to Energy – Quadratic Fit
  - Energy to Shape (FWHM) – Quadratic Fit
  - Energy to Efficiency – Natural Logarithm Polynomial Fit across full energy range; or Linear, Quadratic, and Point-to-Point Interpolation fits for separate high and low energy regions
  - Peak-To-Total (Cascade Summing)

- **γ Calibration Processes**
  - Automatic Energy Calibration (U.S. Patent No. 6,006,162)
  - Calibration Wizard
  - Semi-Automatic and Manual/Interactive
  - Automation using Job Functions
  - Automatic Energy Calibration Adjustment during Analysis

- **γ Calibration Reports and Graphic Display**

Quality Assurance

Periodic instrument performance checks are necessary to ensure that the system is operating properly when samples are analyzed. These checks may be required by regulations, standards, or other governing bodies that may audit the results. The minimum performance measures should include validation of the system calibration parameters, limits that define acceptance and a warning when these limits are exceeded. Control charts for trending is also desirable and formally required for some applications.

Key Quality Assurance Features:

- **γ ANSI N13.30 and ANSI N42.14 Compliant**

- **γ Parameters Monitored**
  - Background Count Rate
  - Total Source Activity
  - Total Spectrum to Library Peak Energy Difference
  - Average Actual to Calibration FWHM Ratio
  - Average Actual to Calibration FWTM Ratio
  - Individual Peak Details Available in Database

- **γ Warning and Violation Limits with Optional Detector Lock-out**

- **γ QA Reports and Trend Charts**
GammaVision 7

User Interface and Security

GammaVision provides an intuitive user experience with the MCA Emulator “Spectrum Window” being the focal point of operation. This approach simplifies routine processes, such as hardware control and count rate/peak evaluation, but also provides the base for more advanced operations such as calibration, QA, and spectrum analysis with the most commonly used functions implemented as “hot keys” or toolbar buttons for rapid access.

The spectrum view offers all of the tools needed for basic MCA emulation including Hardware Control, Peak Navigation and Zoom functions, Region of Interest evaluation, Interactive Peak Search, Spectrum Overlay for comparison, Isotope Markers to identify nuclide common peaks, Summing/Subtraction of other spectra, and Spectrum Channel Smoothing. It also enables user preferences for color schemes and spectrum data views.

For easy access to spectra, GammaVision’s Multiple Detector Interface (MDI) mode can display up to 16 interactive windows (8 Detectors and 8 Files) with independent operation. Additionally, multiple detectors can be enabled for efficient group operations by synchronizing routine Start, Stop, and Clear processes from a single command.

Spectra are traditionally collected in Pulse Height Analysis (PHA) mode with data stored in channels related to pulse height. GammaVision 7 now allows the pulse heights to be stored in “List Mode”, or time-correlated events, with the ability to filter the events after acquisition by user-defined time ranges. This process allows long acquisitions to be scanned by shorter time ranges to identify when activity was detected or interrogate a specific period of interest.

Basic sample measurements are simple processes when using the standard “Ask on Start” options. Just check the user inputs required for each measurement and the user is prompted to select the applicable files or input sample data when the acquisition is started. Additional options may be set to automatically save and analyze the spectrum and print the analysis report.

Key User Interface Features:

- **Spectrum View**
  - View up to 8 live detectors and 8 saved spectra simultaneously
  - Real Time display update during acquisition.
  - Zoom In/Out independent of Full Spectrum Window
  - User-Defined Spectrum Properties: Colors, Data Points

- **Interactive ROI/Peak Calculations**
  - Peak Centroid, Shape, Gross/Net Area and Activity with Uncertainty
  - Variable Number of Background Channels
  - Improved FWHM accuracy when peak centroid falls between two channels.

- **Advanced Features**
  - Fast Mariscotti Peak Search to instantly mark Regions of Interest
  - Region of Interest (ROI) reports in Column or Paragraph format
  - Isotope markers with peak amplitude estimation to confirm peak source
  - Interactive ”Jump to Peak” by ROI, Library Energy, or Peak Search options
  - Spectrum overlay for direct visual comparison to a reference
  - Combine Spectra by Channel Summing or Stripping
  - Spectrum Smoothing to improve statistically poor peak shape
  - List Mode Spectra filtered by Time Range
  - Ask On Start Basic Measurement process

- **Security**
  - Menu Level Password protection
  - Detector Locking by Owner
Although the toolbar and menus options are simple and intuitive, this method of operation does not guarantee consistent processing that is often needed for measurements performed frequently or by different individuals. In these circumstances a more structured approach using simple text scripts called “Jobs” may be preferred. This feature enables every detail of the process to be defined in advance or created dynamically by a custom user interface. Virtually all of the hardware commands, analysis parameters, and processes required measurements can be programmed for consistent and reliable results every time.

Key Automation Features:
- Simple Text Scripts require no prior programming experience
- Define and Set any Analysis Parameter or prompt for user input
- All Hardware Control functions available
- Jobs may be dynamically generated by custom data entry interfaces
- Custom Variables available for advanced programming
- Run External Applications and wait for completion

The interface between hardware and software is provided through the ORTEC CONNECTIONS framework which supports 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 GammaVision and other standard ORTEC applications.

Windows 7 64-bit hardware compatibility is available for all ORTEC instruments that use USB and TCP/IP connectivity. These instruments, as well as other legacy hardware, are also supported with Windows 7 and XP 32-bit operating systems. Instruments that are dependent on a host computer, such as plug-cards or USB devices, can be shared on a network through the MCB Servers running on each computer. This process allows Windows 7 64-bit computers to operate instruments that are not 64-bit compatible through their 32-bit host.

Key Hardware Control Features:
- List Mode Data Acquisition
- High Voltage Bias Control
- Course and Fine Gain Adjustment
- Zero and Gain Stabilizer
- SMART-1 Detector functions
- ZDT loss-free counting correction
- Analog and Digital Amplifier Filters
- Automatic and Manual Optimization
- Sample changer control
- Insight Oscilloscope mode
- Battery Voltage monitoring for portable instruments.
- State-of-Health Monitoring
- Acquisition Presents including Real and Live Time, ROI Peak, ROI Integral, Peak Uncertainty, or MDA
### Ordering Information

<table>
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<tr>
<th>Model</th>
<th>Description</th>
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<tbody>
<tr>
<td>A66-BW</td>
<td>GammaVision High Resolution Gamma Spectroscopy Software for Windows. Includes standalone or first network copy and binary use license.</td>
</tr>
<tr>
<td>A66-NW</td>
<td>Single Use Network Copy. Requires current version of GammaVision. Example: For a three-station network, order one copy of A66-BW and two copies of A66-NW.</td>
</tr>
<tr>
<td>A66-UW</td>
<td>Update from A66-B32, A66-BW, or A66-NW to latest version of GammaVision.</td>
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<tr>
<td>A66-VW</td>
<td>GammaVision V&amp;V Test Results and Certificate of Validation.</td>
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### Subscriptions

Subscriptions are available for any current GammaVision license acquired through the purchase of A66-B32, A66-BW, A66-NW, A66-BVW, and A66-UVW models. Subscriptions provide automatic updates for one licensed copy as new releases become available.

| A66-2YW | 2 year subscription for GammaVision |
| A66-3YW | 3 year subscription for GammaVision |
| A66-4YW | 4 year subscription for GammaVision |
| A66-5YW | 5 year subscription for GammaVision |

### Options

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<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>A11-B32</td>
<td>CONNECTIONS Programmer's Toolkit with ActiveX™ Controls</td>
</tr>
<tr>
<td>A12-B32</td>
<td>Analysis Results File (UFO) Toolkit</td>
</tr>
<tr>
<td>A44-BW</td>
<td>Report Writer Option for GammaVision</td>
</tr>
<tr>
<td>A49-B32</td>
<td>DataMaster Spectrum File Conversion</td>
</tr>
<tr>
<td>ANGLE-B32</td>
<td>Advanced Efficiency Calibration Software for HPGe Detectors</td>
</tr>
<tr>
<td>C53-B32</td>
<td>Nuclide Navigator® III Master Library</td>
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<tr>
<td>LVIS-B32</td>
<td>Counting Laboratory Application Manager</td>
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1. Instruments using the IPX/SPX protocol require Windows XP. This may be accomplished on a Windows 7 computer using the XP Mode Virtual Machine. Instruments that have a Dual-Port Memory option can take advantage of the DPM-USB to communicate over a USB connection in the Windows 7 or XP environments.

2. Additional details for hardware functions are available in the relevant product literature.

3. List Mode Data Acquisition is available for specific instrumentation, such as the DSPec-50/502, DSPec-Pro, and others.