

# Introduction

LVis is a graphical user interface for our GammaVision® Gamma-Ray Spectrum Analysis and MCA Emulator software (A66-BW), designed for use in counting laboratories.

Almost by definition, a counting laboratory deals with large numbers of samples, which may arrive in batches from a client, commercial or otherwise. Most commonly, the economics of operating the laboratory mean that the sample measurements are carried out by a technician with oversight from an expert-level spectroscopist. In order to maintain quality in this circumstance, the management of large numbers of samples in a simple manner with a minimal change of operator entry is highly desirable. LVis is designed to fill that need.

LVis is an “application manager” product. It uses the underlying software components of GammaVision to control acquisition hardware, and to manage the gamma spectroscopy samples in a counting laboratory. The analysis itself is performed using the tried-and-tested analysis capabilities of GammaVision itself. LVis provides a sophisticated sample automation environment to control acquisitions and analyses based upon pre-determined “parameter sets” which allow entry of sample-specific data by a technician as needed, while pre-loading automatically that information which can pre-specified by an expert or supervisor. Because LVis relies on core functions within GammaVision, the two applications must be used together.

GammaVision’s operation is “spectrum-oriented,” i.e., the user operations are generally related to the spectrum visible on the screen. This may be preferred by the expert user, but it is not the simplest approach for a counting lab technician.

The LVis approach is “detector- and sample-type-oriented.” The operator works from a left-hand “Configuration” sidebar, choosing an available detector (or multi-detector configuration) and the detector-specific “parameter set” configured for the detector geometry and type of analysis to be used. The process is as automated and straightforward for a technician to use as it can be.

Consistent with making sample automation as simple and streamlined as possible, LVis includes other features such as custom reporting and, most importantly, automatic generation of meaningful filenames through a system of “dollar (\$) commands”. This latter feature means that LVis can generate filenames that automatically include within character strings that indicate the sample type, origin, operator ID, date, time, and other optional data. Alternatively, LVis can store all data for a measurement, including spectrum, analysis parameters, and analysis results, in a database file. This should enable the export to different databases (e.g., LIMS) or the generation of different export formats (such as .txt files, .b3h, etc.) without any great effort.

## Program Description

LVis is aimed at users who wish to control several measuring chains (HPGe detectors and their associated electronic measuring equipment); or manage several different measurement geometries including required files such as libraries, calibrations, and correction tables. LVis development focused on providing an easy-to-use, clear, and intuitive interface to minimize user errors.

For hardware actuation (start, stop, delete, read spectrum, hardware parameter adjustment), LVis uses the ORTEC Connections32 communication interface used for all ORTEC spectroscopy hardware.

In addition, GammaVision .JOB files (macros) are used, however these are automatically compiled by LVis. The raw spectrum data (.CHN file), which is read via the Connections32 interface, is imported via a temporarily generated JOB file into the GammaVision buffer. The selected library and calibration are imported into the GammaVision buffer as well. Next, all analysis parameters are loaded via a temporarily generated .SDF file. Then, this information (data, library, calibration and analysis parameters) is saved into a temporary .SPC spectrum file. This .SPC file is then evaluated using the analysis algorithms contained in GammaVision. The generated analysis results, which are stored in a temporary .UFO file, are read, exported into a database and displayed in LVis. This database can be separately saved as Microsoft Access .MDB database.

In order to create a report, the database generated during a spectrum analysis is read and the data inserted into a report template. These report templates can be created using the SAP BusinessObjects® Crystal Reports® software v11 or later (which must be purchased separately) however existing reports can be modified with an integrated Crystal Reports Designer.

The most important analysis parameters can be adjusted in a user interface provided by LVis. As many of these settings are in general specific for a particular measuring geometry (and a detector), these default settings are stored in so-called parameter sets. These parameter sets are assigned to the detectors incorporated in LVis. All setup possibilities in such parameter sets can be defined by an administrator. The analysis parameters contained in the parameter sets are based upon the .SDF file ("Sample Type Settings") provided by GammaVision. All analysis parameters of a GammaVision .SDF file that are not included in the LVis parameter sets, are taken from the Default.sdf file stored under the \Config folder in the LVis database directory. The temporary .SDF file required for analysis is then automatically generated based on a parameter set and the Default.sdf file.

In addition, it is possible to specify sample characteristics in a parameter set that can be pre-defined by an administrator and only selected by the user (e.g., sample location, measuring category, user).

LVis saves measurements in .LVM files. By default, the .LVM file is stored using a path containing the detector and used parameter set. This .LVM file contains spectrum raw data, analysis parameter, and, if already analyzed, analysis results of the last analysis as well as copies of the used library and calibration.

GammaVision cannot use two MDA methods at the same time. If methods are selected, which require calculation of two different MDA values (e.g., IMIS, KTA, etc.), then the MDA calculation is performed based upon analysis results from GammaVision (peak area, background region. etc), however the calculation itself is executed in LVis.

LVis contains its own quality control. Within the scope of this quality control, energy and full width half maximum calibration, efficiency calibration and the background can be verified. As the verifications are specific per detector, QA measurement parameters are assigned to a detector (similar to parameter sets). QA measurement development over a user-defined time period can be graphically presented in report form (based upon templates, which can be edited using Crystal Reports as well).

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