

## Product Description

NuSOFT GAMWIN is a user friendly software package used for routine processing of results of gamma spectrometric measurements (spectrometric data acquisition, processing, analysis and evaluation). The system includes the usual features for nuclides identification and quantification, searching peaks and determining their area, fitting peaks (including the fitting of multiplets) and subtraction background peaks.

## Versions and options

**NuSOFT GAMWIN Lite** - This basic version is designed for full control of acquisition and all MCA hardware features and properties. Basic functionality for spectrometry data acquisition and analysis. Free of charge for NUVIATech radiometry HW family.

**NuSOFT GAMWIN Scint** - Advanced Spectroscopy Analysis Software. Sophisticated analytical software tool for gamma radiometry and spectrometry based on scintillation detectors - e.g. NaI(Tl), LaBr<sub>3</sub>(Ce) and other. Limitation: Processing of up to 2048 channels spectra. Unavailable analytic functions and parameter modules requiring properties and resolution of semiconductor detectors. modules requiring properties and resolution of semiconductor detectors.

**NuSOFT GAMWIN Full** - Comprehensive gamma spectrum analysis solution for semiconductor photon detectors gamma-ray spectra (routine processing of results of gamma spectrometric measurements). Unlimited functionality.

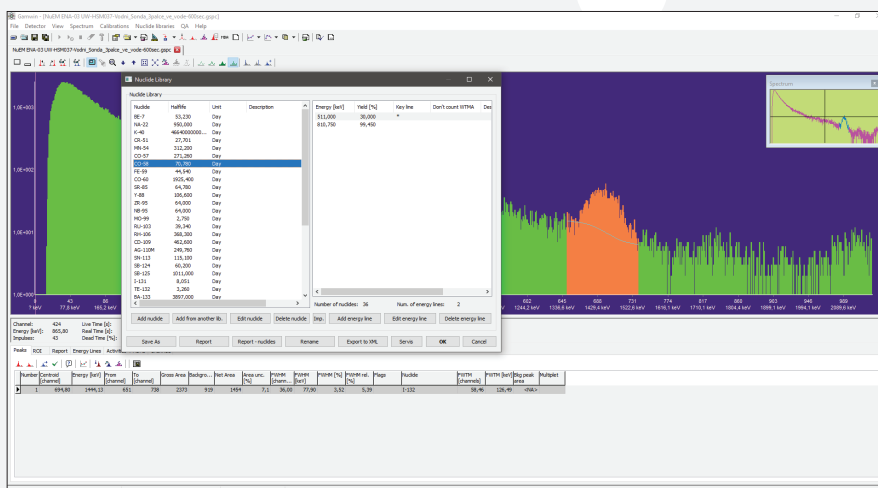
## Product specifications

**Supported spectrum file formats** - The NuSOFT GAMWIN software uses its own file formats for spectra, calibration, nuclide libraries, etc. Besides these own native formats, it can also work with third-party formats\*, such as:

- Ortec\* spectra, type CHN and SPC
- Canberra\* spectra, type CNF
- SPE type spectra
- IEEC type spectra
- Thermo\* spectra
- AlphaVision Ortec\* spectra
- EffMaker\* spectra
- Ortec\* nuclide libraries
- Genie2K\* nuclide libraries
- Ortec\* calibrations

The software allows opening any number of spectrum files and it can be connected simultaneously to multiple analyzers. The available features include linear or logarithmic scale view, setting of custom color scheme and enlargement of any part of the spectrum.

**Control of analyzers** - HW Drivers: NuSOFT GAMWIN includes a general interface for controlling spectrometric hardware (analyzers). For each type of spectrometric analyzer there are specific drivers available. All versions of the NuSOFT GAMWIN software include a standard software interface and support (drivers) for spectrometric hardware (analyzers) of manufacturers / brands: NUVIATech Instruments, Ortec, Canberra and GBS Elektronik. Software interface and support (drivers) for controlling spectrometric hardware from other manufacturers are available on user request.



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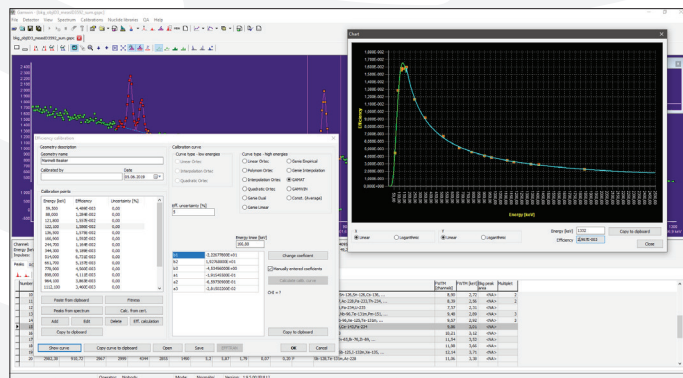
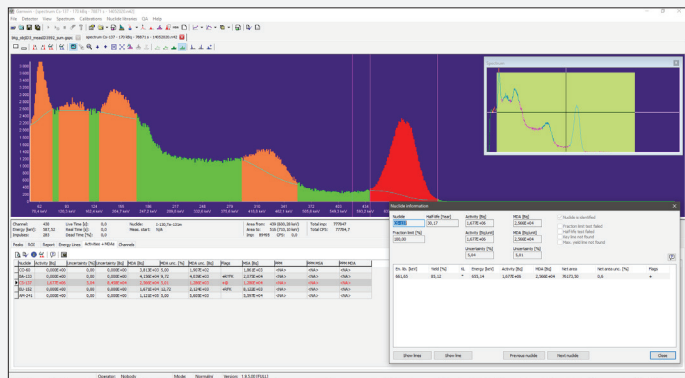
## Product specifications

**Searching peaks:** The function allows automatic peak search (first or second derivation method) - determination of the peak, start and end channels of the peak. A function for determining peaks based on user-defined Regions of Interest (ROIs) or on the nuclide library is also available. The list of peaks is shown in a table and in a report. The areas of peaks found can be also automatically marked as a ROI. For each peak, it is possible to display a window with detailed information.

**Peak area determination:** This function is designed to determine the area of peaks; its outputs are the total and net areas of peaks, the number of background pulses, the Full Width at Half Maximum (FWHM) and the Full Width at Tenth Maximum (FWTM). The uncertainty of neat peak area is also calculated. The peak area determination may include, as an option, a critical level test. The results are shown in a table and in a report. If FWHM calibration is performed, the program lists any larger deviations in FWHM from the expected value for the identified peaks.

**Peak fitting:** The identified peaks can be fitted using the non-linear method of least squares. It is possible to fit multiplets as well as singlets. The fitting procedure uses the performed FWHM calibration and, if applicable, low-tail calibration (if performed). After fitting, it is possible to display the residues at an absolute scale or at the scale of uncertainty of the measured value.

**Subtraction of peaks in the background:** This function allows reading of interfering peaks in the background. Apart from the subtraction of peaks during the gamma spectrum analysis, it is also possible to use a function for the subtraction of peaks in the alpha spectrum.



**MDA/MSA determination:** The module contains routines to determine the minimum detectable (significant) activity using the Currie method and KTA. The results are shown in the form of a table and in a report.

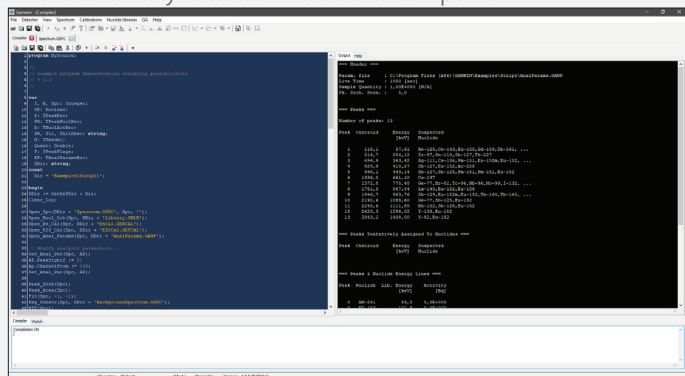
**Nuclide identification and activity calculation:** The module makes it possible to identify nuclides on the basis of a selected nuclide library. The activity of the detected nuclides is determined in Bq, along with their specific activity in the specified unit, if applicable (e.g. Bq/l, Bq/kg). Activity can be calculated on the basis of key line, line with the maximum yield and weighted average. For identification, it is possible to use the half-life test (possible presence based on conversion half-life), the yield test (fraction limit test), key line test (presence of a key line in the spectrum). The results are shown in the form of a table and in a report. If activity is determined using weighted average calculation and interfering nuclides are detected in the spectrum, it is possible to correct the activity for interference. The linear method of least squares is used for these purposes. The resulting activity can be also corrected using user-defined constants or correction for specified correction constants or correction for attenuation of the flow of photons in the shielding material. The resulting activities can be also re-calculated using the nuclide vector. The uncertainties for the calculated activity values are also determined. If necessary, the results are corrected for the presence of an absorbent layer between the measured sample and the detector, or for self-absorption in the sample; the user only has to specify the composition of the absorbing material and its physical parameters (attenuation coefficients are already available).

**Nuclide libraries:** NuSOFT GAMWIN allows editing of custom nuclide libraries; it is also possible to use libraries from the Ortec\* and Canberra\* systems. For each nuclide, it is possible to enter an individual value to perform the fraction limit test (yield test). A tool for importing the nuclide library from an MS Excel\* file is also available. The installed system includes several nuclide libraries, which can be used as a source for creating custom user libraries.

**Certificates:** NuSOFT GAMWIN allows editing, saving and retrieving files with data on radionuclide standards - «certificates». Using the data stored in the certificate file, it is possible to carry out energy and efficiency calibrations of the spectra easily. The certificate files are also used to analyze alpha spectra - the certificate file contains data on the tracer used.

**Energy, FWHM and tail calibration:** The system enables energy and FWHM calibrations. Calibration can be performed manually by inputting the channels and the corresponding energies in keV, or by loading the retrieved peaks in the spectrum and adding energies in keV. It is also possible to apply automatic calibration using the certificate file or the nuclide library. NuSOFT GAMWIN also makes it possible to load energy calibration data from other systems. Linear and quadratic calibration curves are available for energy calibration and several types of curves for FWHM calibration. In addition, it is possible to carry out low tail calibration.

**Efficiency calibration:** The system allows to carry out manual efficiency calibration and to perform efficiency calibration using the certificate file. It also includes the possibility to load the calibration curves from other systems. Among other features, it is possible to use two polynomials (for the low-energy and high-energy regions of the spectrum), where continuity is tested in the transition point.



**Report:** The output from the spectrum analysis can be a text report containing user-defined data (peak search and analysis, description of calibrations, determination of nuclides and activity, MDA determination, data on the spectrum file, analysis parameters, etc.). Optionally, it is possible to set automatic saving in a text file when it is generated.

**Batch jobs - scripts:** NuSOFT GAMWIN includes a custom environment for editing and running batch jobs - scripts in Pascal-type language. Using the scripts, it is possible e.g. to automate routine activities, generate special reports, export data to other systems, etc.

**Plug-ins:** The system allows running of customer function created as plug-ins. In this way it is possible to extend the application core with additional customer modules and functions. An example of real-life application is a fully automated control of a measuring machine.

**API:** The system has an Application Programming Interface (API) to create additional customized applications in the NuSOFT GAMWIN system. User programs can take use of dynamically linked libraries or console utilities (e.g. for the batch processing of the spectrum file).

**QA - Quality Assurance:** The system includes functions for quality assurance. The user can define various parameters (peak position, FWHM, count rate in the specified ROI, nuclide activity, etc.) and the estimated value, including limits. After analyzing the possible results of the analysis (reference parameters) to migrate to the appropriate QA file and then you can generate a report with a comparison of current-measured and estimated values, including their variations and any threshold is exceeded. The user can generate a report for any measurement or a summarized report for a selected period. The data can be also exported in the XML format for further processing.

**Platforms:** NuSOFT GAMWIN is designed as a standard user application for Microsoft Windows\* platforms.

**Language versions:** The software exists in three languages: Czech, English, French and Russian. Other languages can be easily added on demand using a translation file.

## Product applications

- Laboratory applications
- Nuclear industry

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