

INTUITIVE DEVICE SETUP

Connecting to a detector with ProSpect software allows counting within minutes. Simply connecting your device to your computer or network will populate your device in two tabs provided at the bottom of the application; the Discovered Devices tab will show any compatible MCA that is connected to your computer or via a network, and the Discovered Detectors tab will show connected MCAs that have been configured with a detector definition – name, description, high voltage settings. The tabs show thumbnails displaying the state of the hardware (idle, waiting, busy, fault) and a snapshot of the data it contains.

Detectors or devices are opened via double-clicking the thumbnail. Detectors open with the defined configuration loaded (suitable for frequent counting with the same detector), while devices open in the last state of the MCA.

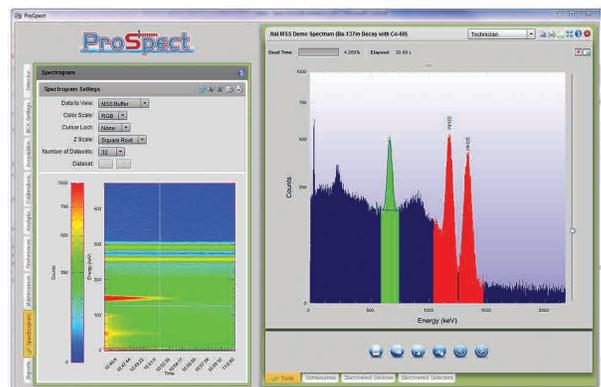
FULL RANGE OF ACQUISITION MODES

The software provides access to the full range of acquisition modes that are available on the Osprey and Lynx units:

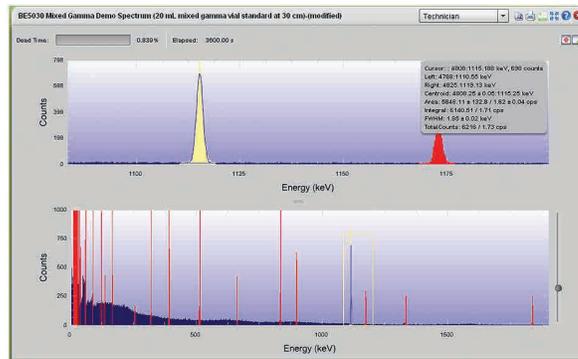
- Pulse Height Analysis (PHA) acquires an energy histogram of all ADC events for spectroscopic analysis.
- Multi-Channel Scaling (MCS) acquires a time histogram of ADC events.
- Dual Loss Free Counting (DLFC) acquires two energy histograms of ADC events for spectroscopic analysis. One is a normal PHA histogram. The other is a live time corrected histogram. This is a Lynx unit only feature, and is useful for high count rate applications where the dead time is high and accurate live time correction is required.

- LIST acquires the ADC data in event-by-event format, providing the energy of each event in a list.
- TLIST acquires the ADC data event-by-event format, providing the energy and time each event in a list.
- Multi-Spectral Scaling (MSS) is continuous segmented PHA spectral acquisitions, acquired in time slices, where the time between each acquisition is minimized.

The Spectrogram tab provides a means of analyzing MSS data. When viewing MSS data, the x axis of the color plot represents the time of acquisition of the slice, the y axis represents energy, and the color of the data denotes number of counts. The spectrogram can be used to identify short lived activity where the color for a particular energy changes with time (as is the case in the example below for the Ba-137m decay at 662 keV which has a half-life of 2.35 minutes). Long-lived activity (such as Co-60 in the example) shows no change in color. The spectrogram plot includes cross-hairs that can be used to select a (time, energy) coordinate. This presents the corresponding time slice as a histogram in the main view on the right hand side with the cursor at the selected energy. The spectrogram tab can also be used to view PHA data sources side by side, allowing for rapid comparison.



TLIST mode can be used to simultaneously acquire data with two or more devices that are synchronized to use the same device clock. This allows time correlations to be identified between events detected in different detectors (i.e. events occurring within a specified time window that is set in offline data analysis). This can be used to either select (coincident) events or reject (anti-coincident) events. Common applications utilizing anti-coincidence are cosmic veto and Compton suppression systems that are used to reduce the contribution of unwanted events in order to improve the minimum detectable activity of the nuclide of interest. The ProSpect user manual includes instructions for acquiring TLIST data with synchronized devices.



INTERACTIVE SPECTRAL PLOT

One of the main advantages of ProSpect software is its intuitive spectral plotting. The main features are as follows:

Region of Interest setting – setting a Region of Interest in ProSpect software is as simple as clicking the mouse button and dragging from left to right across the region. As the mouse moves, the software draws the peak fit and the continuum so that the user can validate the extremities of the defined region as it is being drawn. The start and stop channels for a defined region can be edited by double clicking the region.

Flexible expand and zoom function – the application supports zooming with the mouse wheel with an associated pan function for scrolling to different parts of the energy range. Zooming with a traditional expand box (pictured) is also available. The two functions can be used together or interchangeably to maximize usability.

Customizable tooltip for peak information (pictured below) – this allows peak information to be displayed in a tooltip when hovering over a defined region of interest with the mouse. The location and content of this tooltip can easily be defined on the Preferences tab.

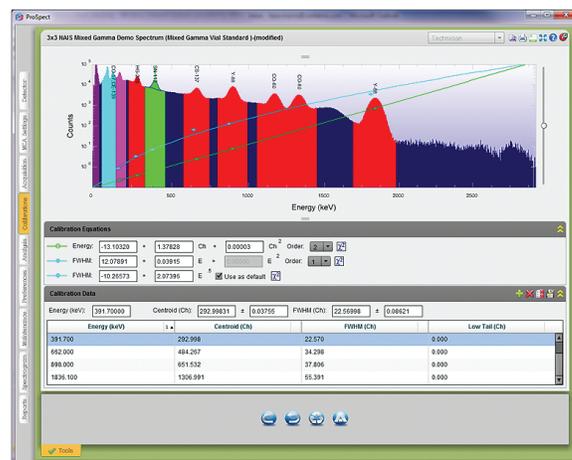
Additional features – such as full screen mode (for maximizing the spectral plot area) and the means to detach the expanded region to a separate window for viewing on a second monitor.

LYNX SIMULATOR

Perfect for a training environment, the application includes a Lynx simulator. This allows the user to recreate spectral acquisitions, varying acquisition and gain parameters. Simulators can be treated as devices or saved as a detector definition for later use. Additionally, with the Spectrum Load function, the user has the capability to replace the default seed spectrum with their own unique spectrum (supports Genie .CNF format spectra in addition to ProSpect XML format).

INTEGRATED ENERGY CALIBRATION MODE

ProSpect software offers an innovative solution to calibration that provides many different means of performing energy, shape and low tail calibrations within a single integrated screen. The screen (pictured) includes the spectral plot for the calibration data – this is fully functional allowing peaks to be fitted and used as calibration data. Calibration data is shown as data points overlaid at the correct energy on the spectral plot, as well as being displayed in a data grid. Data can also be entered manually into the data grid (in which case the software also adds the data point to the spectral plot overlay). These displays are linked such that when a data point is selected on the spectral plot, the corresponding row in the grid is highlighted (and vice versa).



The software also includes an automatic calibration function (available on the calibration toolbar at the bottom of the screen). This allows an automatic calibration involving a peak analysis using a full nuclide library (which can be loaded or created during the automatic calibration function) or using specific nuclides within a library.

Each time data is added (either manually through the spectral plot or data grid, or using the automatic calibration function), the calibration equations are automatically calculated and displayed – the user is able to change the order of the polynomials used for the fit and can choose from two separate equations for the shape calibration (a polynomial and a square root function). The calibrations equations are displayed as continuous fitted lines overlaid on the spectral plot, and the goodness of fit (reduced Chi-squared value) is available for each equation along with a visual indication of whether the fit is acceptable.

EASY TO USE ANALYSIS FEATURES

ProSpect software offers a single analysis function that performs an integrated peak locate, peak area and tentative nuclide identification calculation using a defined nuclide library. The software offers a simple to use nuclide library editing function where nuclides or specific lines can be added from a reference library to the custom library (to be used for the analysis) using the mouse drag and drop method or by using icon buttons. Libraries can be easily loaded or saved and ProSpect software provides a set of application specific libraries (medical, norm, SNM and industrial).

ProSpect software simplifies analysis set-up and the user is only required to define the following: the peak significance threshold (for the peak locate calculation), the continuum function and channels (for the peak area calculation) and the energy tolerance threshold (for the tentative nuclide identification). Using these parameters, the application performs a second-difference peak search on the full range of the spectrum and fits the found peaks with a Levenberg-Marquardt Nonlinear Least Squares Fit algorithm. The application can be configured to analyze manually (through an execute button) or to analyze automatically when the data updates (e.g. during counting) or when analysis settings change. The results can be exported to CSV format or can be printed on a report (which can be stored in pdf format).

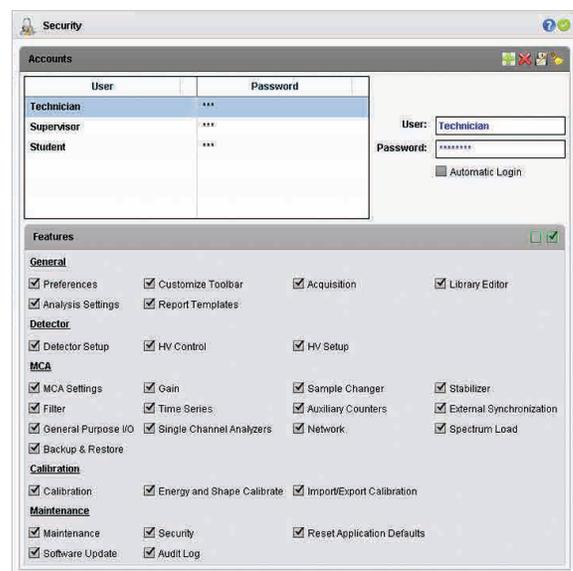
EASY TO READ DATA FORMAT

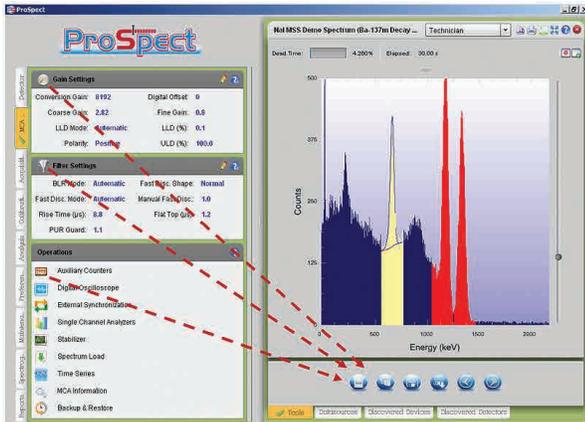
Data is stored to a comprehensive file in an XML format that can be read by standard third party software such as Notepad or Word. This ASCII text based file contains all information associated with a count including the detector electronics settings, MCA settings, acquisition settings, calibration information, raw data (e.g. spectral histogram data for PHA acquisition), regions of interests, analysis settings, nuclide library, and analysis results. This file can be read by ProSpect software or can be used to extract information about the count.

SECURITY AND CUSTOMIZATION

The software provides several means for setting up the application to suit the needs of the user. User accounts can be defined that expose only the specific functionality that the user needs or is allowed to have (as determined by the system manager). This reduces the amount of training required and scope for error.

The spectral display can be customized through a range of easily accessible preference settings. The application also provides status LEDs can be modified to show only those that are appropriate for the user. The main toolbar can also be easily customized by dragging and dropping the icons for frequently used operations such as Calibration, Acquisition Settings, Gain Settings and Filter Settings (as shown on the following page).





ENHANCED DSP SETUP

ProSpect software provides access to all the advanced functions of the Osprey and Lynx DSP. Examples include:

- The setup and control of Auxiliary Counters.
- External Synchronization for the synchronization of multiple MCAs on a common clock (useful for TLIST acquisition).
- Signal Channel Analyzers for setting up energy windows for viewing the evolution of the total counts within an energy region over time (using the Time Series data view) and for energy gating other devices in coincidence and anti-coincidence acquisition modes.
- Access to a gain Stabilizer (Lynx unit only).
- Programming of the three Osprey General Purpose Input/Output channels (not available for the Lynx unit and therefore not pictured above).
- Spectrum Load allowing count data to be loaded back into an MCA for continuing a count (or for changing the spectrum to be acquired for a simulator).
- A useful Backup & Restore function for storing and restoring the full set of MCA settings.



For the Lynx unit, access to a Digital Oscilloscope is provided. When invoked, this occupies the main panel of the screen to allow a concurrent view of the MCA setting editing and the analogue and digital traces facilitating the set-up of MCA hardware.

SYSTEM REQUIREMENTS

ProSpect requires a personal computer with:

- 2.0 GHz Dual Core Pentium highly recommended
- 2 GB memory, 200 GB hard disk; CD ROM, USB
- Integrated 10/100 Ethernet interface
- 1024x768 video adapter
- Windows 7 (32- and 64-bit) and Windows XP Professional (32-bit)

TLIST/LIST acquisition is validated for two devices acquiring simultaneously with a count rate of up to 25 kcps in each device.

Performance is enhanced with better computer resources. Consult the factory for assistance in configuring a system to the needs of your specific applications.

HARDWARE SUPPORT

- Osprey-DTB – Osprey Digital Tube Base
- Lynx-MCA – Lynx Digital Signal Processor

ProSpect also provides a Lynx simulator for use without connected hardware.

NUMBER OF INPUTS

ProSpect can operate with no significant degradation with:

- Up to 50 devices connected
- Up to 10 devices open and acquiring simultaneously in PHA mode
- Up to two devices open and streaming LIST/TLIST data (with a max count rate of 25 kcps in each detector)

This assumes a modern PC (Core i5 processor).

ORDERING INFORMATION

- S600: ProSpect Gamma Spectroscopy Software
- Osprey-ProSpect: ProSpect Gamma Spectroscopy Software with Osprey Digital Tube Base (package)
- Osprey-DTB: Osprey Digital Tube Base
- Lynx-MCA: Lynx Digital Signal Processor

