

Miraspec vs MiraspecFlow

Functional Comparison

Miraspec and **MiraspecFlow** are both Lightnovo desktop applications for Raman spectroscopy, but they target different use cases. **Miraspec** is a research-oriented, dock-based instrument control and analysis suite. **MiraspecFlow** is the next-generation platform: compliance-ready workflow platform with centralized data management.

Key Benefits of **MiraspecFlow**

1. Guided, repeatable workflows

MiraspecFlow replaces ad-hoc dock layouts with a fixed five-step pipeline: **Experiment** → **Processing** → **Model** → **Analysis** → **Report**. Operators follow the same path every time, reducing training burden and user error. Projects can be configured upfront (which model and analysis types to include) and saved as templates for reuse.

2. Built for regulated environments

MiraspecFlow adds capabilities Miraspec lacks entirely:

- User accounts and role-based access (Admin, Developer, Operator)
- Audit trail logging user actions against database records
- Electronic signatures for report approval/rejection
- Structured, filterable reports with signing status

This makes MiraspecFlow suitable for pharmaceutical, forensic, or QA labs where traceability matters.

3. Centralized data and project lifecycle

All spectra, models, libraries, projects, and reports live in a single database. Admins get dedicated pages for users, libraries, models, projects, devices, history, and audit trail - a full data governance layer.

4. Tighter instrument integration

MiraspecFlow can sync spectra from the device, upload models and libraries to the instrument, and manage device-side users and PIN codes. Operators can run analyses on the handheld/device and pull results back into the desktop workflow - a closed loop Miraspec does not provide.

5. Newer analysis capabilities

MiraspecFlow adds Mixture Identification and Material Verification workflows that do not exist in Miraspec. It also has a richer report builder ecosystem covering every analysis and model type, plus device-origin reports.

6. Lower operator cognitive load

The stepper UI, contextual help text, dashboard for selected spectra, and guarded navigation (unsaved-changes dialogs, repeat/finish flows) are designed so non-expert operators can run predefined scenarios without navigating dozens of dock windows.

Where **Miraspec** Still Leads

Miraspec remains stronger for research and imaging workflows:

- Live camera microscopy
- XY manipulator / stage control
- Grid scan and hyperspectral mapping
- Panorama stitching
- Multiwell-plate reader
- Particle segmentation and per-particle Raman analysis
- Flexible dock-based layout for power users

Feature Comparison Table

Feature area	Miraspec	MiraspecFlow	Notes
User interface	Multi-window, dockable panels, custom perspectives	Stepper workflow: Experiment → Processing → Model → Analysis → Report	Flow enforces a repeatable process
User authentication	✗	Login with roles: Admin, Developer, Operator, Factory	Role-based UI restrictions (e.g. Operators cannot create projects)
Project management	✗	Projects, templates, history	Projects can be saved as reusable templates
Audit trail	✗	Full audit trail with searchable log	
Compliance readiness	✗	Audit trail, e-signatures, user roles, structured reports	Designed for GxP-style workflows
Spectroscopy acquisition	✓	✓	Both connect to Lightnov Raman instruments
Live camera / microscopy	✓	✗	Planned to be integrated to MiraspecFlow
XY stage / manipulator	✓	✗	Planned to be integrated to MiraspecFlow
Hyperspectral mapping	✓	✗	Planned to be integrated to MiraspecFlow
Multiwell plate scanning	✓	✗	---
Panorama / particle analysis	✓ (ParticleAnalysisWindow, segmentation, reports)	✗	--
Experiment types	Basic, grid scan, multiwell, Z-scan, particle workflows	Basic only	Flow is spectroscopy-first today
Spectral preprocessing	Crop, spikes, smoothing, baseline, normalization, ref spectrum subtraction	Crop, spikes, smoothing, baseline, normalization	Comparable core preprocessing
Identification	✓	✓	Library-based spectrum matching
Mixture identification	✗	✓	Flow-only analysis type
Material verification	✗	✓	Train and apply verification models, syncs verification results from device
Classification	✓	✓	MiraspecFlow provide more user friendly capabilities for training model and prediction

Feature area	Miraspec	MiraspecFlow	Notes
Calibration / quantification	✓ (PLSR, PCR)	✓ Yes (calibration model + analysis; device quantification sync)	Flow also syncs quantification results from device
PCA	✓	✓	MiraspecFlow provide more user friendly capabilities for training model and results visualization
MCR / NMF	✓	✓	MiraspecFlow provide more user-friendly capabilities for training model and results visualization. Additionally resolved spectra can be identified
Spectral libraries	STJapan, custom library	Centralized library admin, STJapan, RRUFF, LN import, export, device upload	Flow has richer library lifecycle
Data storage	✗	✓ Unified database	Flow stores projects, spectra, models, reports, users
Device sync	✗	✓ Bidirectional sync (spectra from device, models/ libraries to device)	
Device management	✗	✓ Full device page: users, libraries, models on instrument	Premium license feature
Reports	✗	✓ Comprehensive report system (identification, mixture, verification, calibration, classification, PCA, MCR, audit trail, device reports)	Flow generates structured, signable reports
Report approval workflow	✗	✓ Approve / reject / filter by signing status	
Device validation	✓ Basic window	✗ Full admin list + workflow step	MiraspecFlow stores devices validation history, check for validation, set validation status to the device
Auto-update	✗	✗	MiraspecFlow checks update on startup
Internationalization	✗	✓ en_US	Support localization (We will add by request)

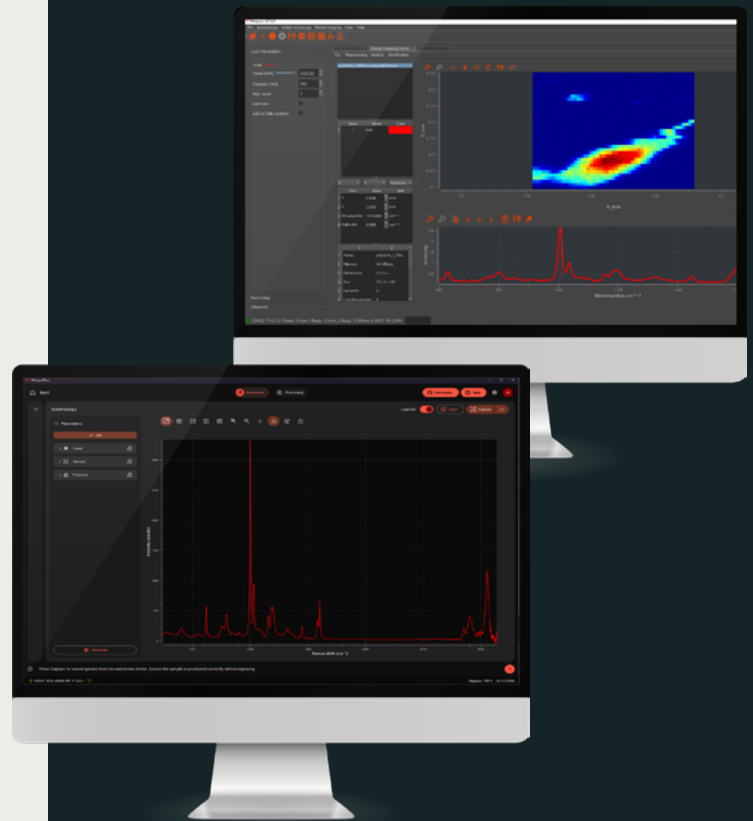
Choose **Miraspec** when...

- You need microscopy, mapping, stage control, or particle analysis
- Users are researchers who want flexible dock layouts
- You work primarily at the bench with open-ended exploration
- Imaging and spatial scanning are core to the experiment
- Compliance/traceability is not a requirement

Choose **MiraspecFlow** when...

- You need guided operator workflows
- You need audit trails, e-signatures, and user roles
- You need build operator-ready SOP and project templates from validated methods and build structured reports
- You need device sync and on-instrument model deployment
- You operate in a regulated or QA-driven environment

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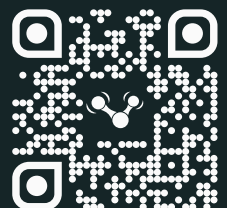
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