The Interactive Way To Control Experiments

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WP-10

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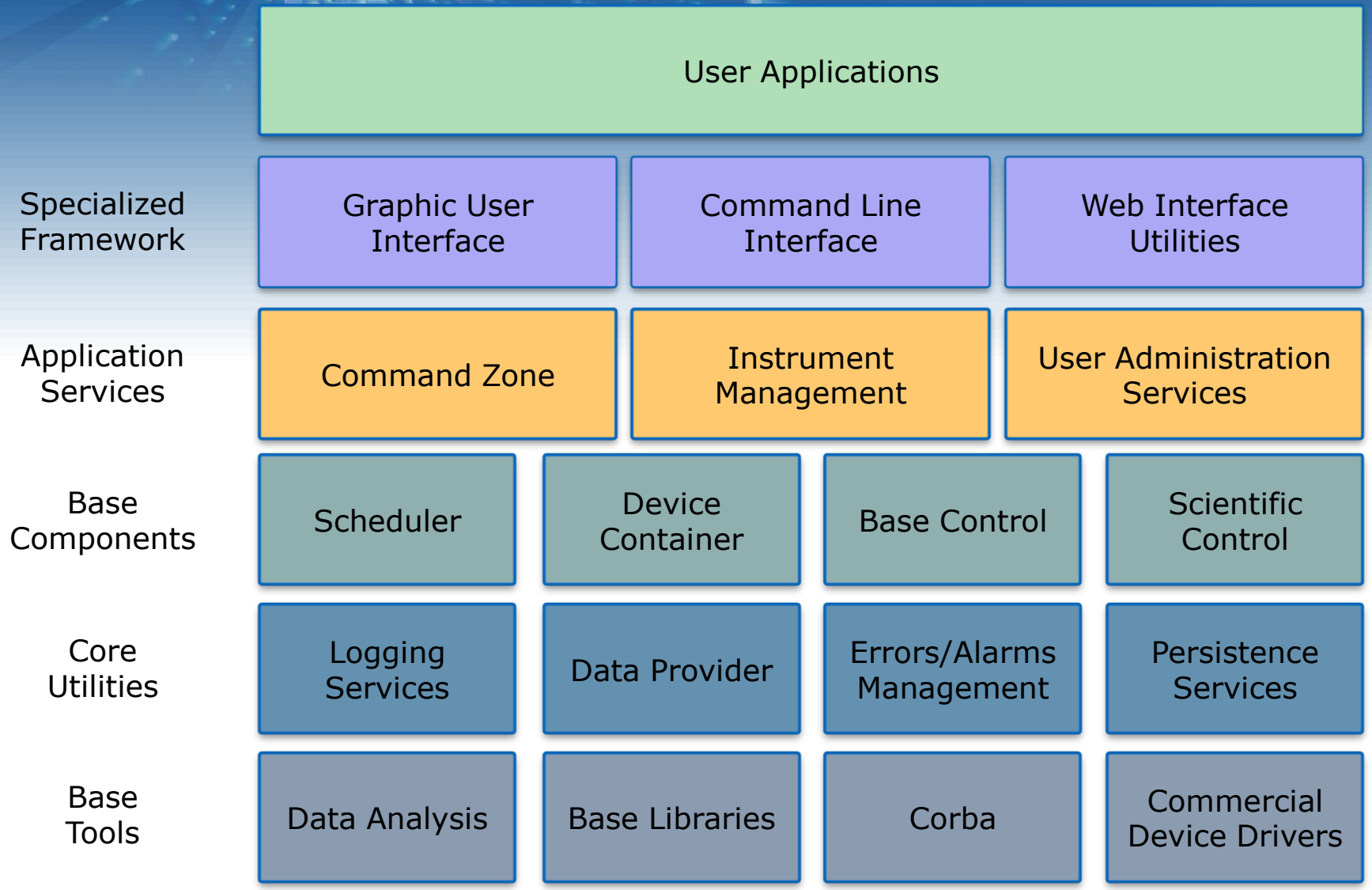
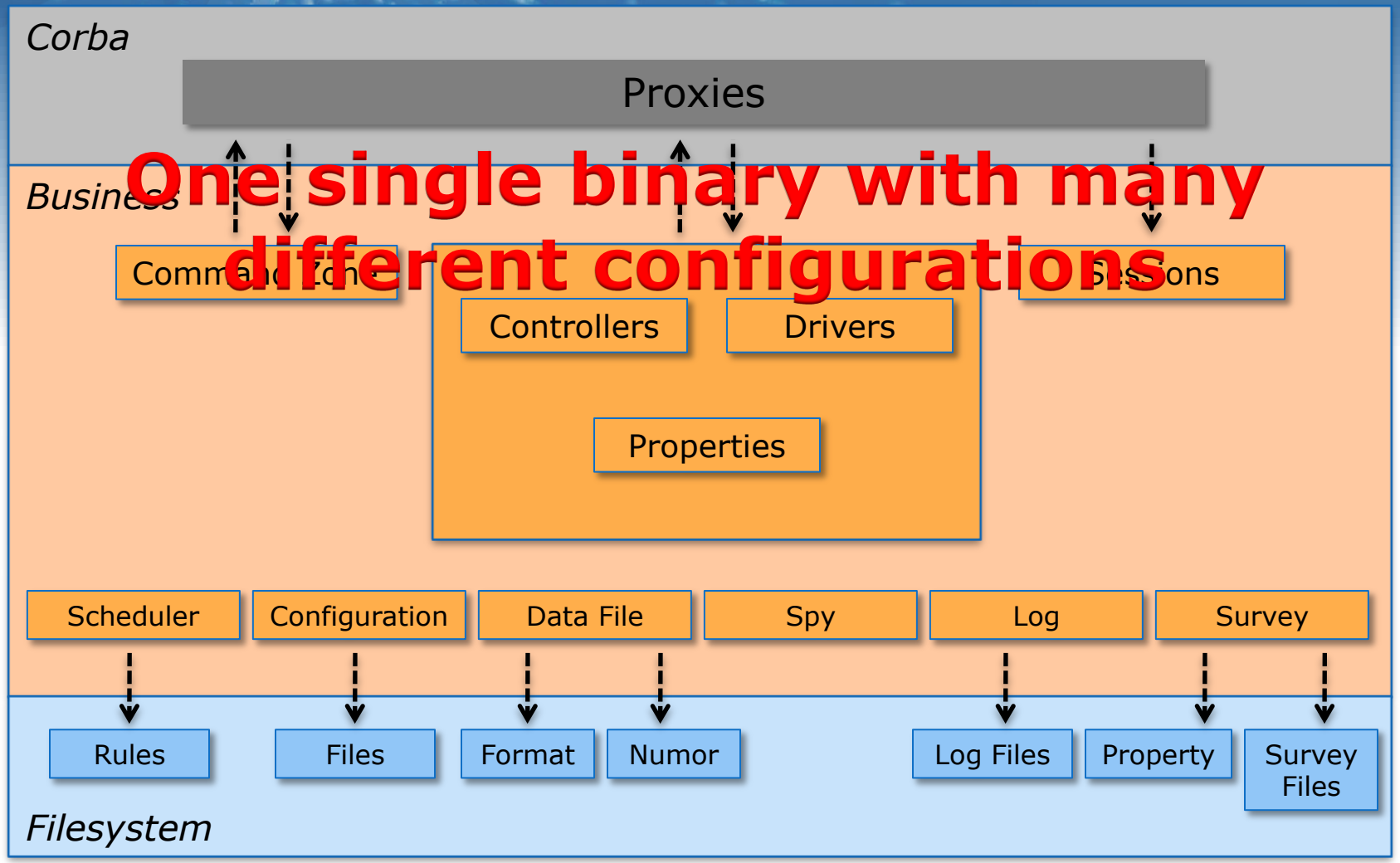
Summary

- ARCHITECTURE PRINCIPLES
- DISCOVERING THE INTERFACE
- SCIENTIFIC CONTROLLERS
- HARDWARE INTEGRATION

Development Framework



Server (C++)



One single binary with many different configurations

Client (Java + SWT)

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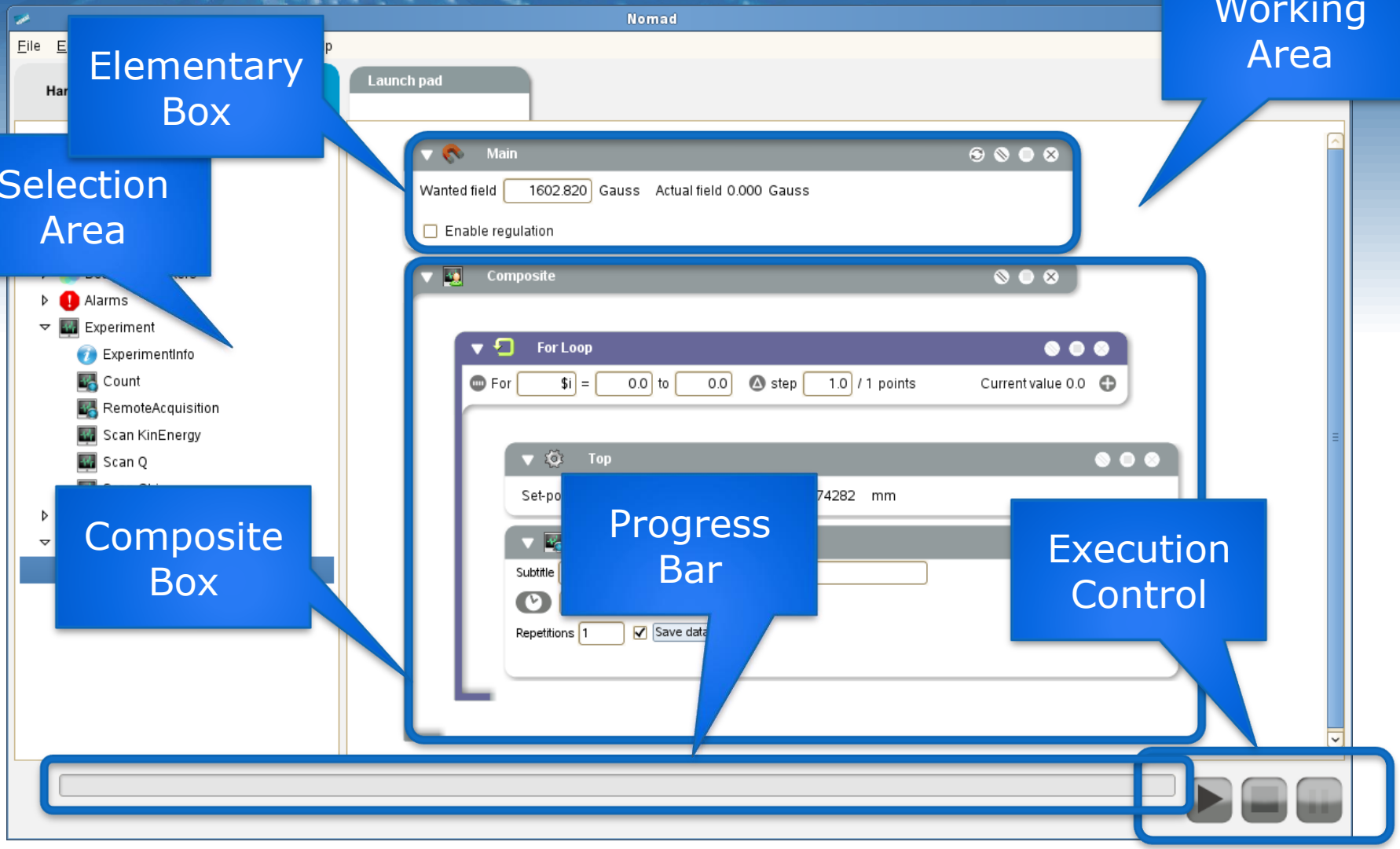
- Isolation of the window toolkit
  - Easy to make changes
- Each class is split in 2 parts
  - Control
  - View
- Dynamic interface engine
  - Each screen is a plugin defined by one XML file. More than 500 plugins without any specific class definition
- Real-time visualization
  - 2D and 3D plot using OpenGL specification

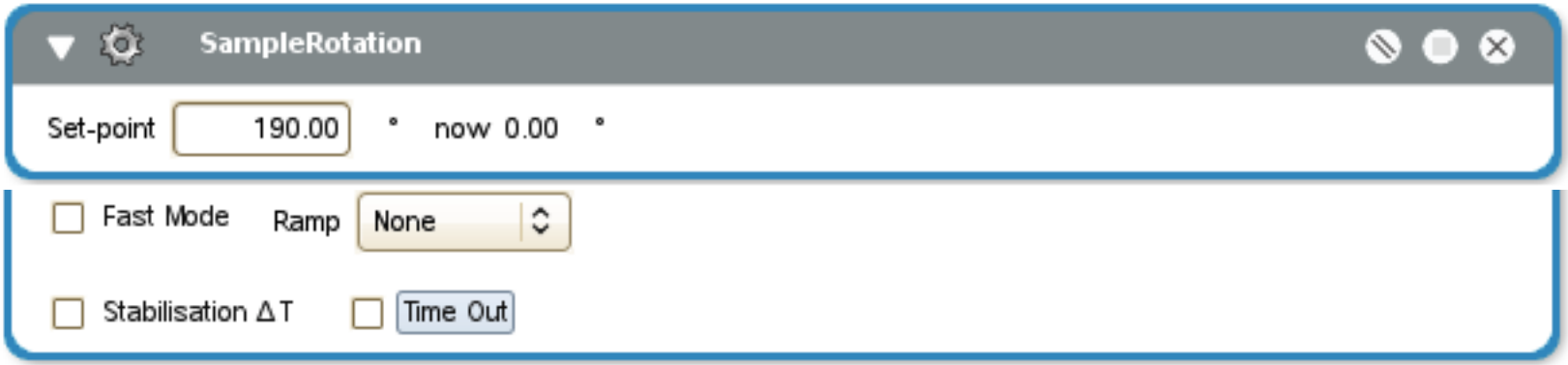
Discovering The Interface



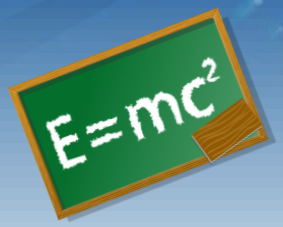
Basic Controllers

Access a single or a composition of hardware components of the instrument
(e.g. axes, cryostat, power supplies, etc…)

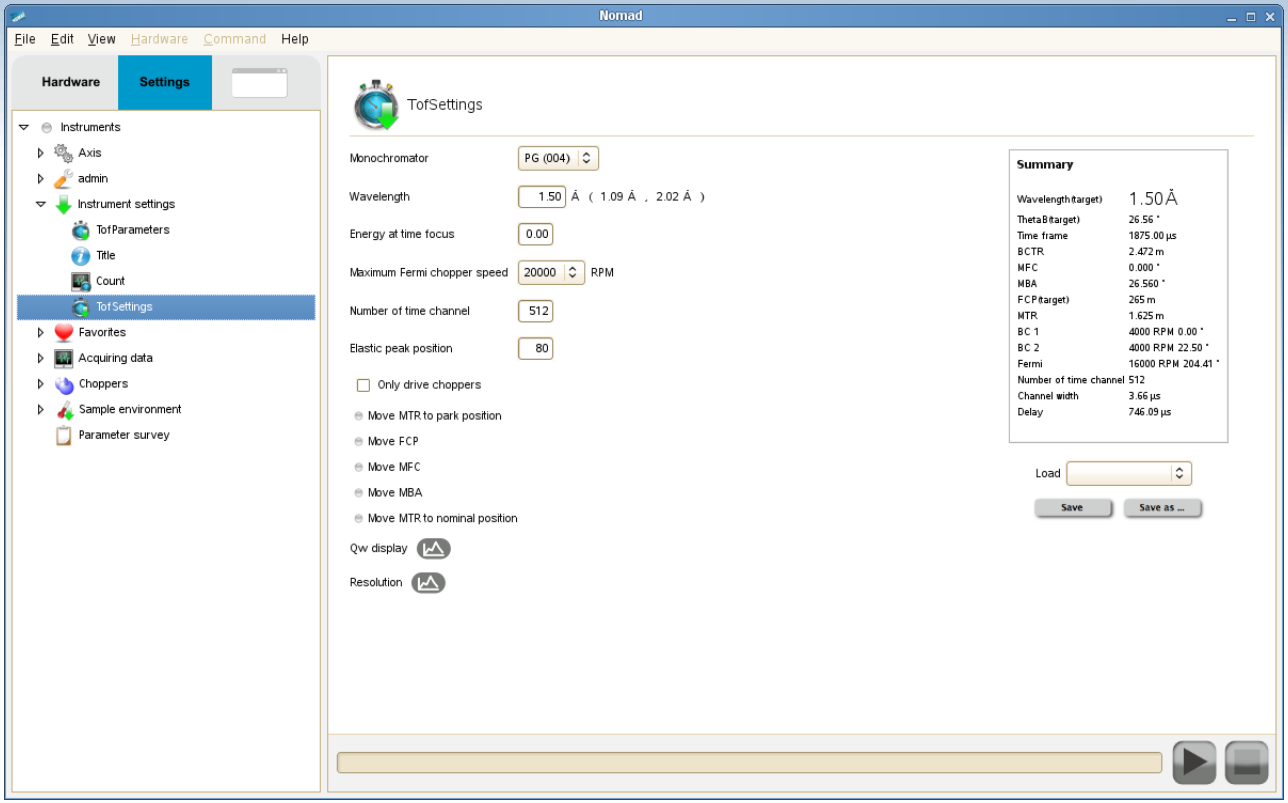
Provide a minimum level of abstraction
(e.g. uses physical units, range)



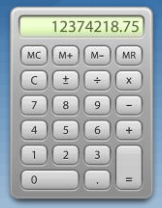
Scientific Controllers



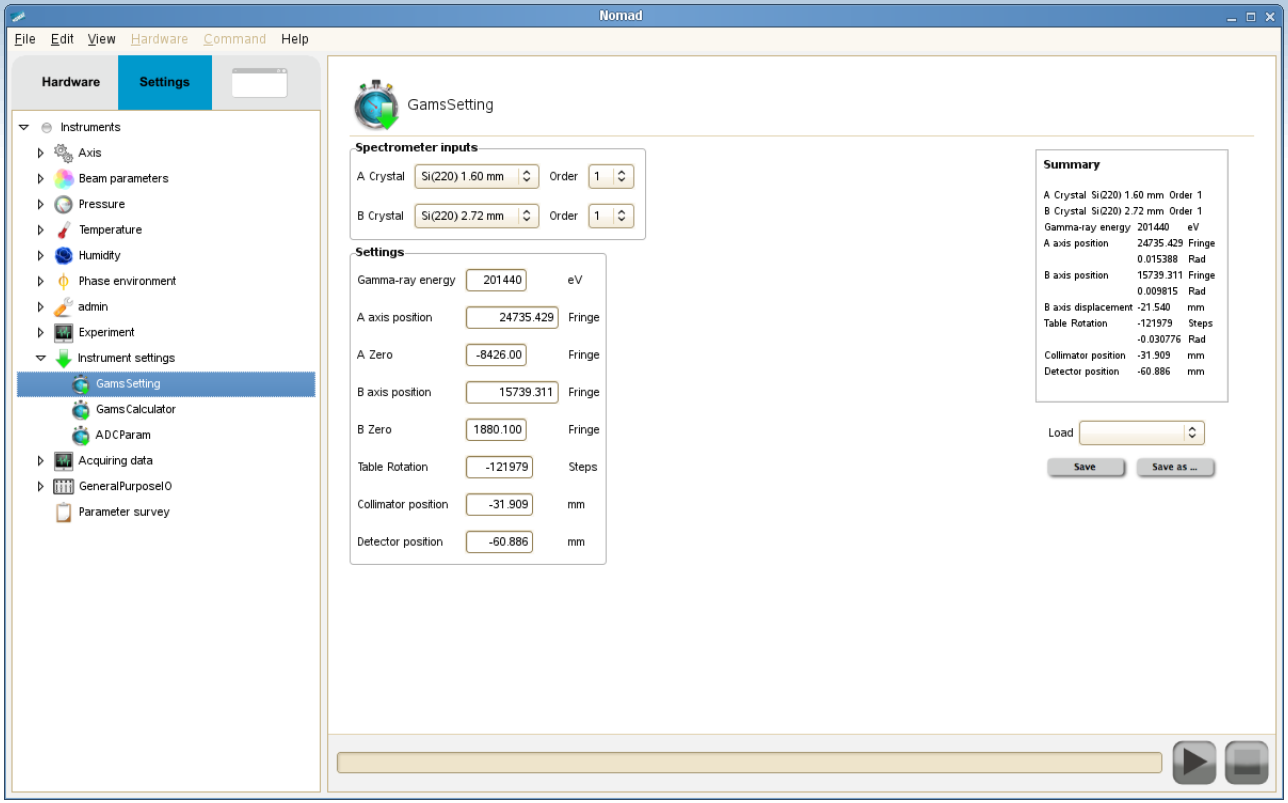
Allow user to work directly with the relevant physical quantities (e.g. λ, Q_{range}, K_i, Energy)



Scientific Controllers

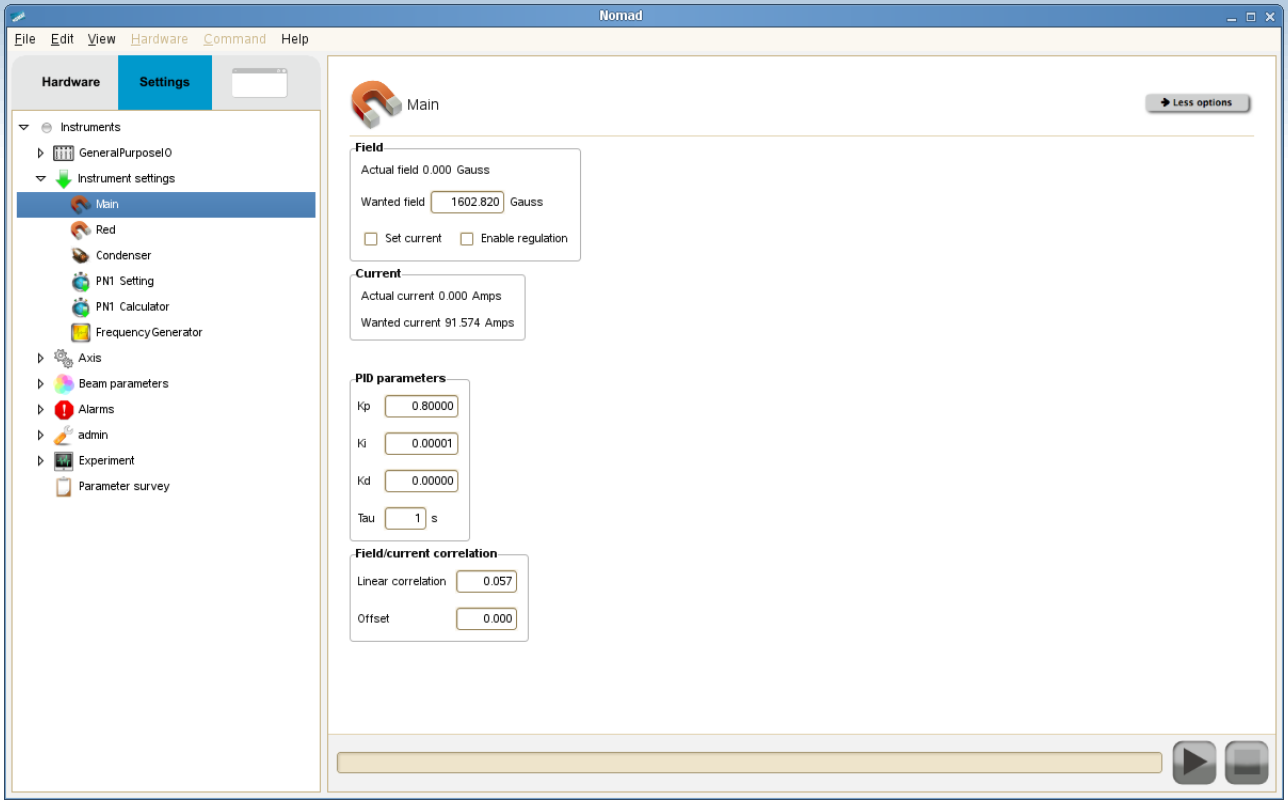


Act as a super calculator for the local contact to access complex instrument's configuration



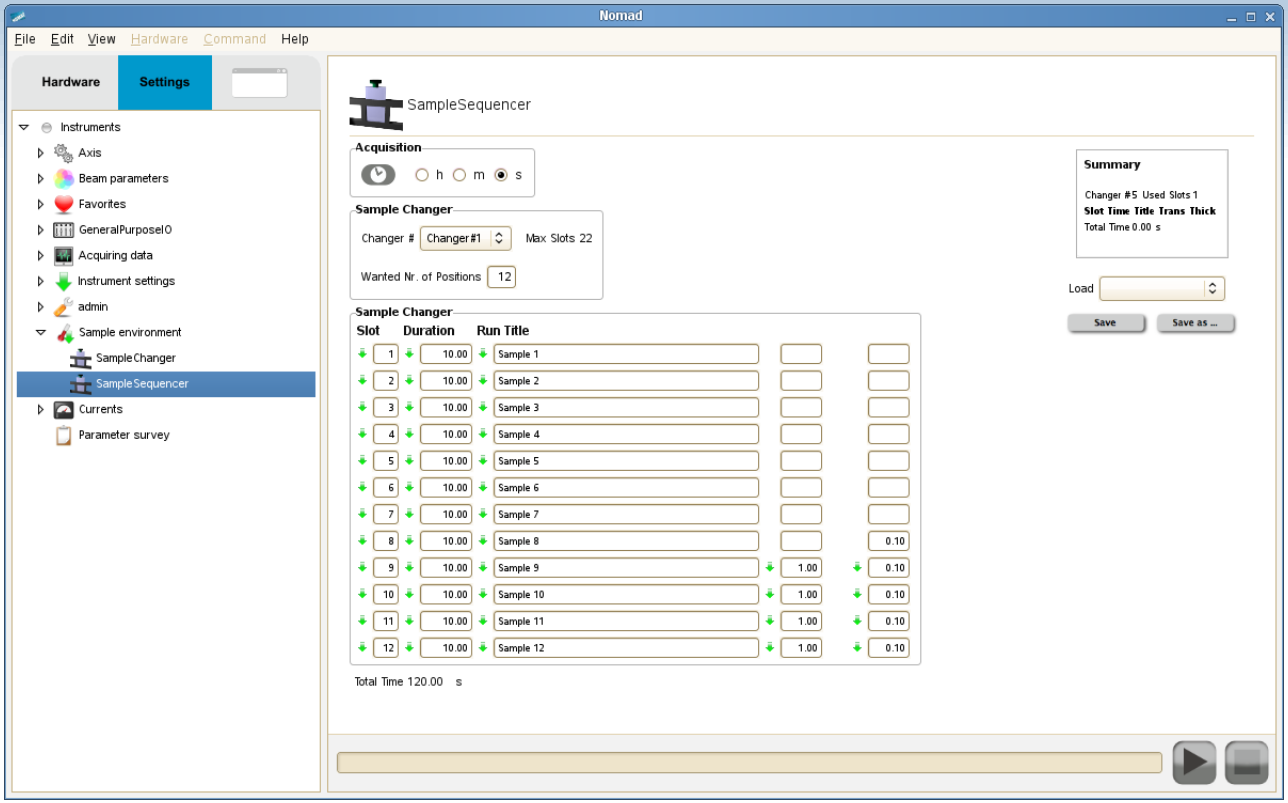
Scientific Controllers

Instrument performance optimizer for fine adjustments or advanced regulations

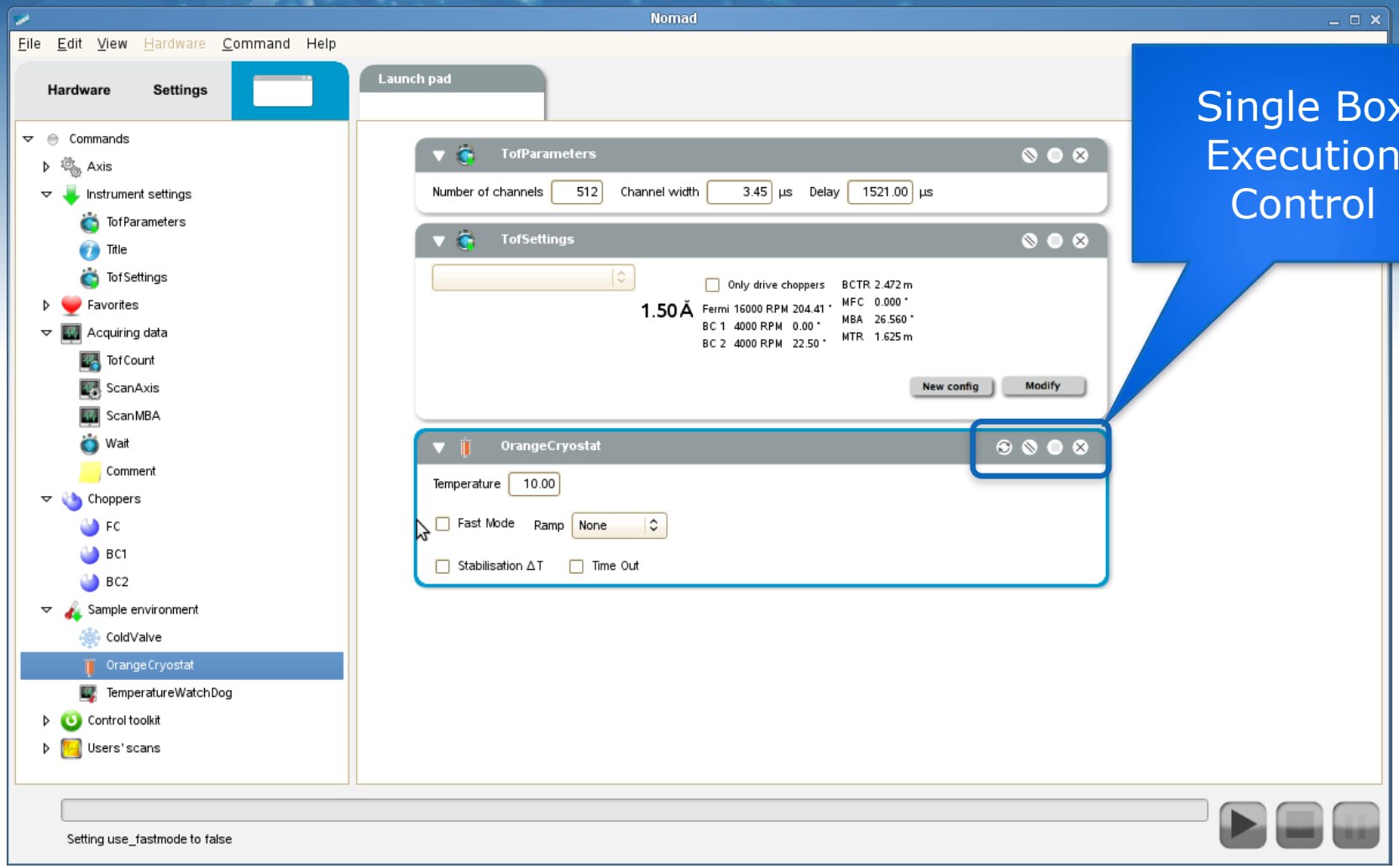


Scientific Controllers

Scheduler for repetitive operations

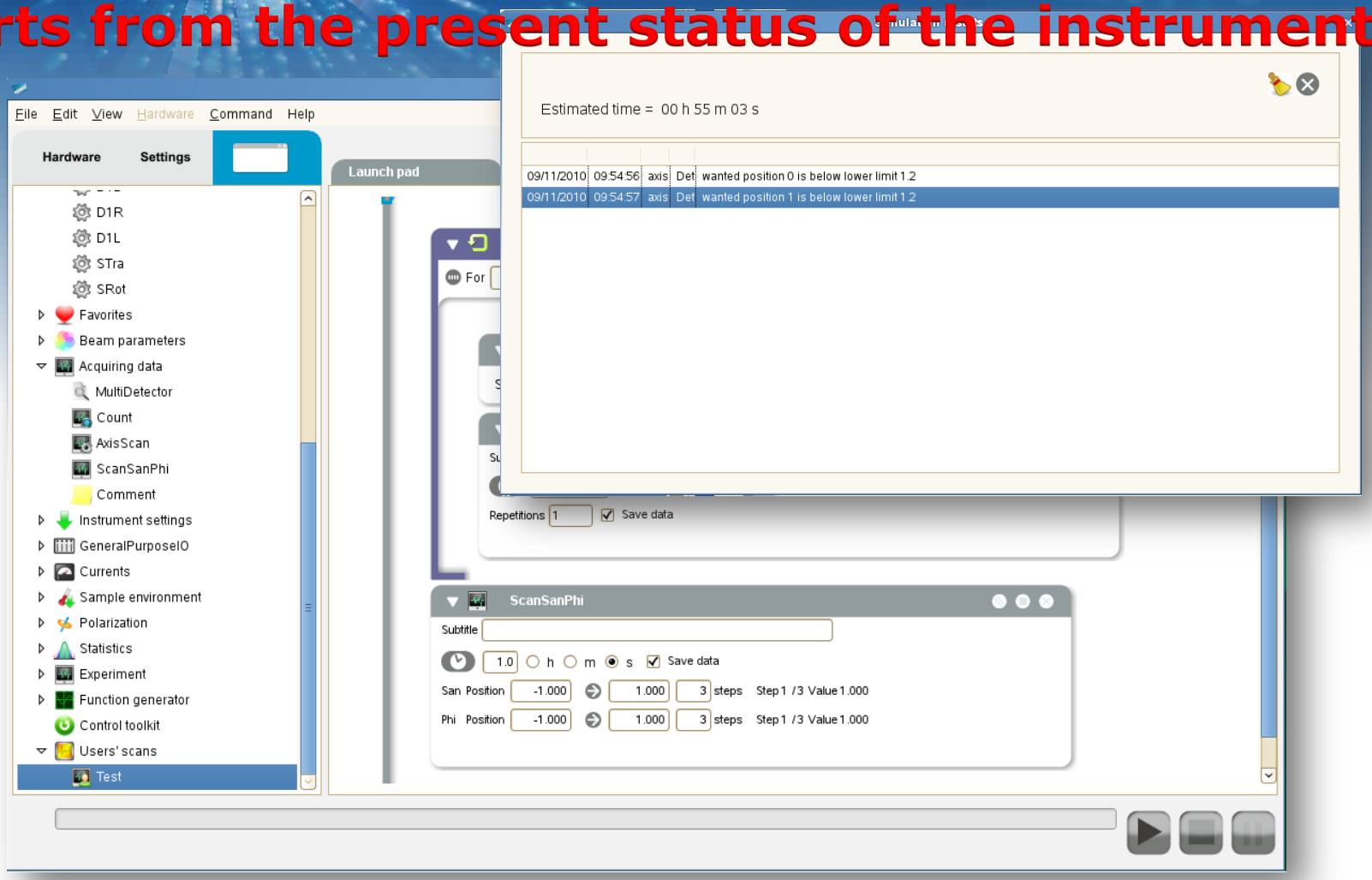


Drag-And-Drop



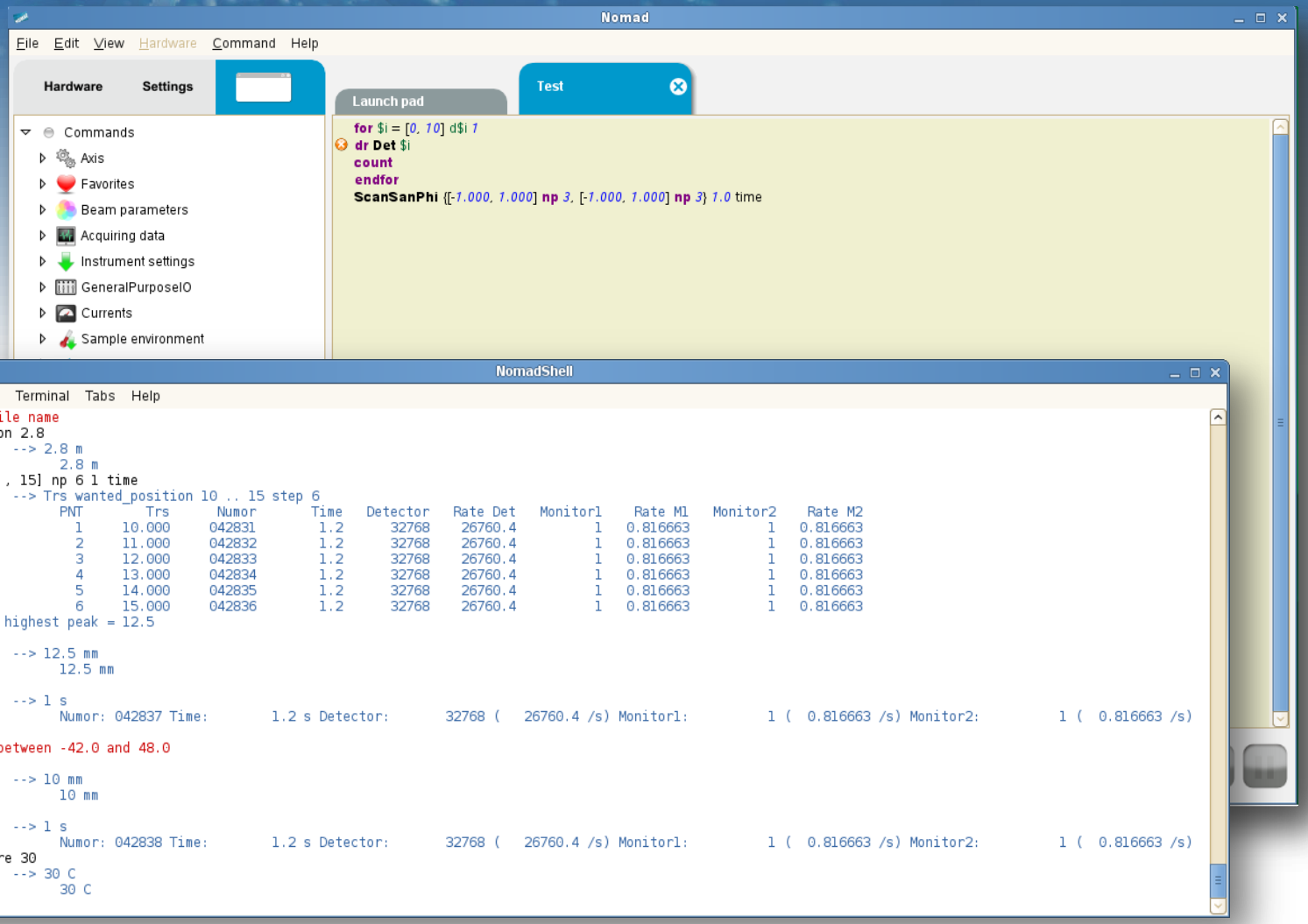
Simulation

Starts from the present status of the instrument



Execution-time estimation and errors check

Command Line



Keep The User In The Loop

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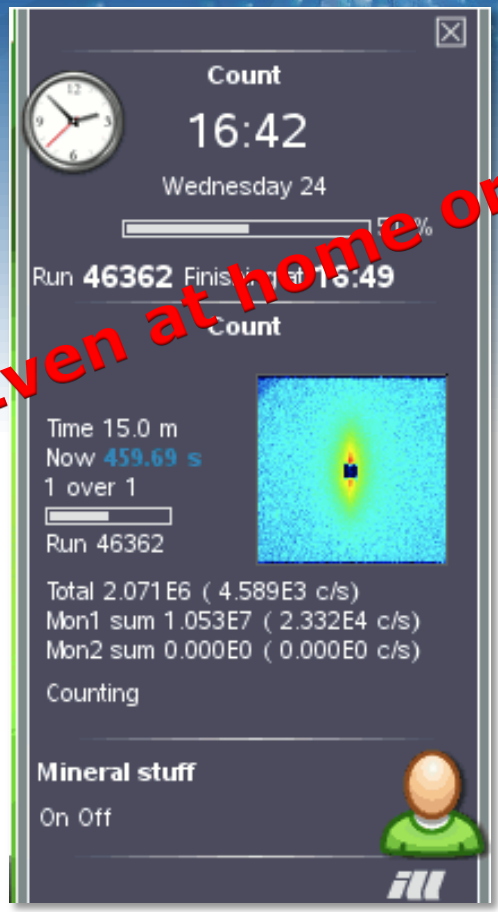
Even at home or at the restaurant



A fully configurable s
status

Hardware Integration

Temperature Watchdog

Double Buffering

- Reduce the dead-time between successive acquisitions
- Allow high data throughput from acquisition electronics to the final storage
- Necessary for list-mode (up to 1Tb per day)