

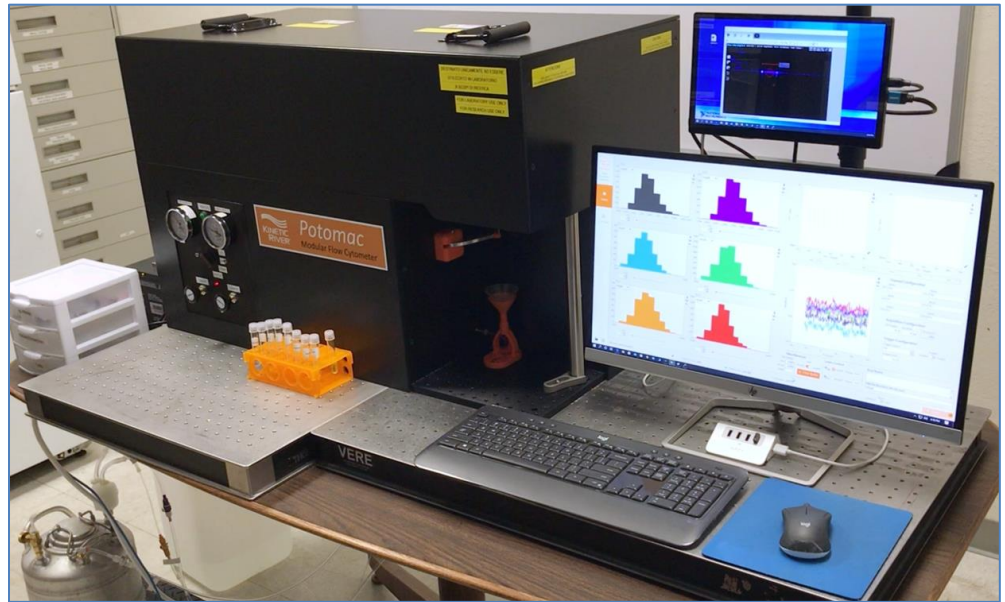


Potomac

Customizable Modular Flow Cytometer Tech Notes

For many applications on the cutting edge of research, “one-size” most definitely does not “fit all.” Whether your work requires the use of exotic light sources, extreme flow rates, custom flow cells, or novel optical setups, the need for flexibility and customization is often at odds with the capabilities of fixed-layout systems.

We designed and developed a **flexible** and completely **customizable** solution to address this kind of need. With a **modular** system architecture and built mainly using off-the-shelf components, the **Potomac** Modular Flow Cytometer adapts to your requirements. Responding to customer feedback, Kinetic River recently redesigned the platform from the ground up to offer optimal performance and maximum flexibility in customization.



The redesigned Potomac which was placed at the National Research Council in Naples, Italy

The **Potomac** architecture can support from **1 to 8 lasers**

(including externally mounted ones), and from **4 to 20 channels of detection**. Long-life solid-state excitation lasers are provided as collinear or spatially separated, and either free-space or fiber-coupled. A dedicated, always-on, remotely controlled microscope **monitors sample core stability**. All filters and beamsplitters are removable and kinematically mounted for hot swapping **without the need for any realignment**. The detection channels use compact PMTs or silicon photomultipliers (SiPMs). The entire optomechanical structure is based on cage cube assemblies to allow for **simple modifications and upgrades**. The fluidics control module consists of quadruple regulation of adjustable sheath and sample pressures for **maximum core stream stability and flow rate flexibility**. A custom DAQ unit manages data collection and signal processing, and the proprietary Panama software provides instant visualization of all channels and parameter combinations.

Most importantly, the **Potomac** can be easily customized for unique requirements, such as porting external light sources or incorporation of a custom component. The system can be also easily **upgraded** over time, allowing you to start with a basic system and adding capabilities as you grow.

The **Potomac** – if you have specialized flow cytometry needs, you won’t find anything else like it.

The Potomac, or use thereof, may be covered in whole or in part by patents in the U.S. and other jurisdictions. A current list of applicable patents can be found at <https://www.kineticriver.com/kinetic-river-corp-patents>.





Excitation Optics

Standard laser options (up to 8):

- 375 nm (≤ 70 mW)
- 405 nm (≤ 500 mW)
- 488 nm (≤ 200 mW)
- 532 nm (≤ 400 mW)
- 561 nm (≤ 200 mW)
- 591/594 nm (≤ 100 mW)
- 638/640 nm (≤ 500 mW)
- 785 nm (≤ 350 mW)

Custom laser options (powers vary from 30 – 500 mW):

- 266, 350, 395, 420, 445, 460, 473, 505, 515, 633, 660, 685, 705, 730, 750, 830, 850 nm

Emission Optics

Scattering channels:

- FSC: customizable
- SSC: 90°, 1.2 NA

Fluorescence channels:

- up to 18 channels
- customizable bandpass selections

Detectors:

- PMTs or silicon photomultipliers (SiPMs)

Fluidics

Dual hydrostatic pressure injection option:

- 8-L sheath capacity, pressure up to 30 psig
- Sample injection speed: 0.3 – 150 $\mu\text{L}/\text{min}$

Syringe drive sample injection option:

- Sample size: 5, 10, 20, 50, or 100 μL
- Injection speed: 0.1 – 60 $\mu\text{L}/\text{min}$

Signal Processing

Data formatting:

- Flow Cytometry Standard (FCS) 3.0
- CSV files
- optional: raw waveforms

Performance

Sensitivity (405-nm excitation, 466/40-nm channel):

- BV421 ≤ 100 MESF (est.)
- 8/8 Spherotech Rainbow bead peaks

Nanoparticle detection (375+405-nm excitation, FSC/SSC):

- 160-nm Megamix-Plus

Resolution (375-nm excitation):

- FL CV 4% (G1 peak)
- FSC CV 2% (ThermoFisher W500CA beads)

Throughput:

- 10,000 events/s (typ.)

Installation Requirements

Dimensions:

- 36" x 20" x 23" (W x D x H)
(monitors, sheath and waste tanks separate)

Weight:

- 200 lbs. (2-laser, 7-detector system; monitors, sheath and waste tanks separate)

Environmental:

- 15°–30°C, 60% RH

Power:

- North America: 120 VAC, 50/60 Hz, 8A
- Japan: 100 VAC, 50/60 Hz, 8A
- Rest of world: 230 VAC, 50/60 Hz, 5A



Interior of a 2-laser, 6-detector Potomac

