

MoFlo[®] Astrios[™] High-Speed Cell Sorter



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MoFlo Fluidics

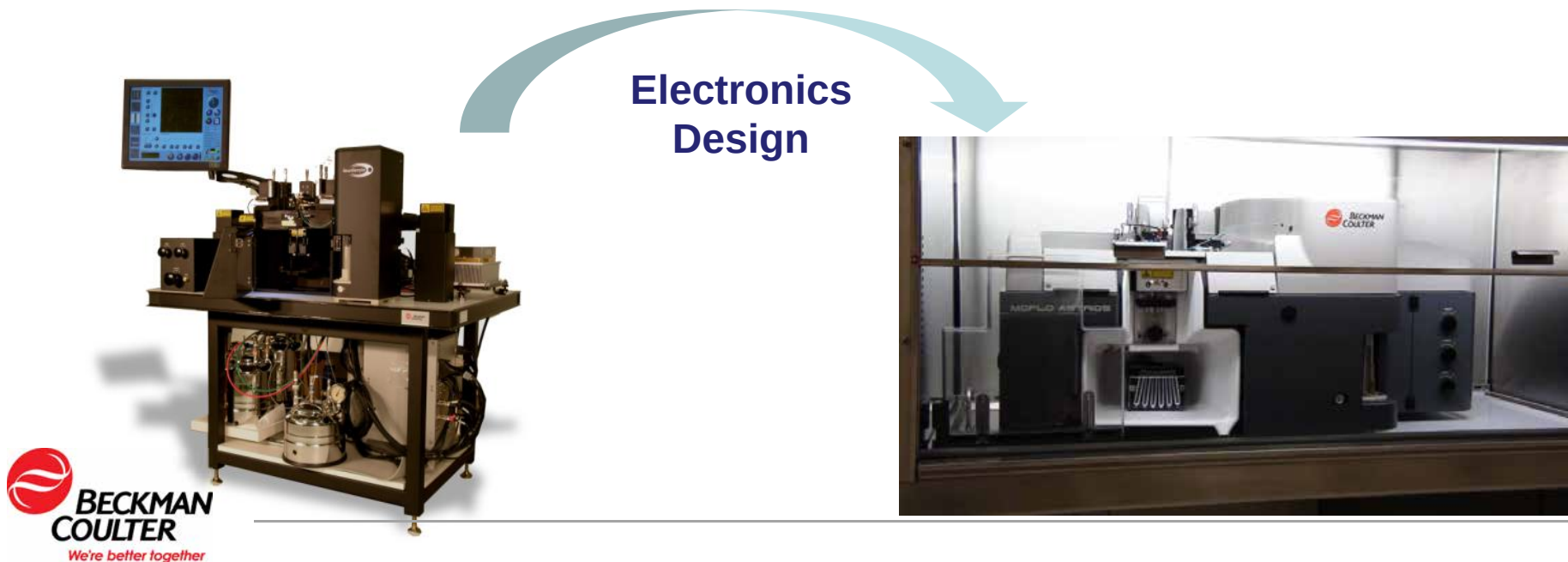
- Stable fluidics are critical for sorting (droplet formation), longevity of a system's use, and precision (stability) of the sort
- Today: MoFlo Legacy systems routinely sort 12 hours per day – 15 years after launch (May, 1995)
- MoFlo XDP and MoFlo Astrios fluidics are largely unchanged for that reason

Fluidics
Design



MoFlo XDP Electronics

- Electronic capabilities of a sorter ensure you make the correct decision on every cell without throwing away sample
- MoFlo XDP electronics were a substantial update to the original MoFlo electronics and led the sorting industry
 - Zero Dead Time (first for a sorter)
 - 100 MHz sampling (first for a sorter)
 - Five-decade: 32 bit processing (first for a sorter)



Modular Flow Cytometry

- **MoFlo** = **Modular Flow** Cytometry
- Beckman Coulter started modularity
- Performance to meet your specifications today
- Scalability to meet your future needs



Floor Standing and Compact

- Front access only
- Fully inclusive fluidics



66" (Length) x 31" (Depth) x 51" (Height)
168cm (Length) x 79cm (Depth) x 137cm
(Height)



External Height: 89" (226cm)
External Length: 65" (165cm)
External Length (including bracket): 69" (175cm)
External Depth: 35" (89cm)
Internal Length: 58" (147cm)
Internal Depth: 29" (74cm)

Front Access Design

- Ergonomically designed from the start
- Critical components within arm's reach
- Accessible fluidics and collection optics
- Adjustable Touch Screen Control Panel



Biosafety – Considered from the Start



- Overall footprint
- Compatibility with external devices
- AES meets ISAC guidelines
- Biosafety cabinet meets NSF-49 specifications

Biosafety – Sample Input



- SmartSampler technology
- Sample input from 0.5 μ L to 50 μ L
- Pressurized sample chamber protects user

Biosafety – Sort Chamber

- Zero hard edges
- R-Theta CyClone® arm enables fully enclosed sort chamber
- Separate chambers isolating aerosols
- Easily cleaned to maintain the sort environment
- Removable Front door

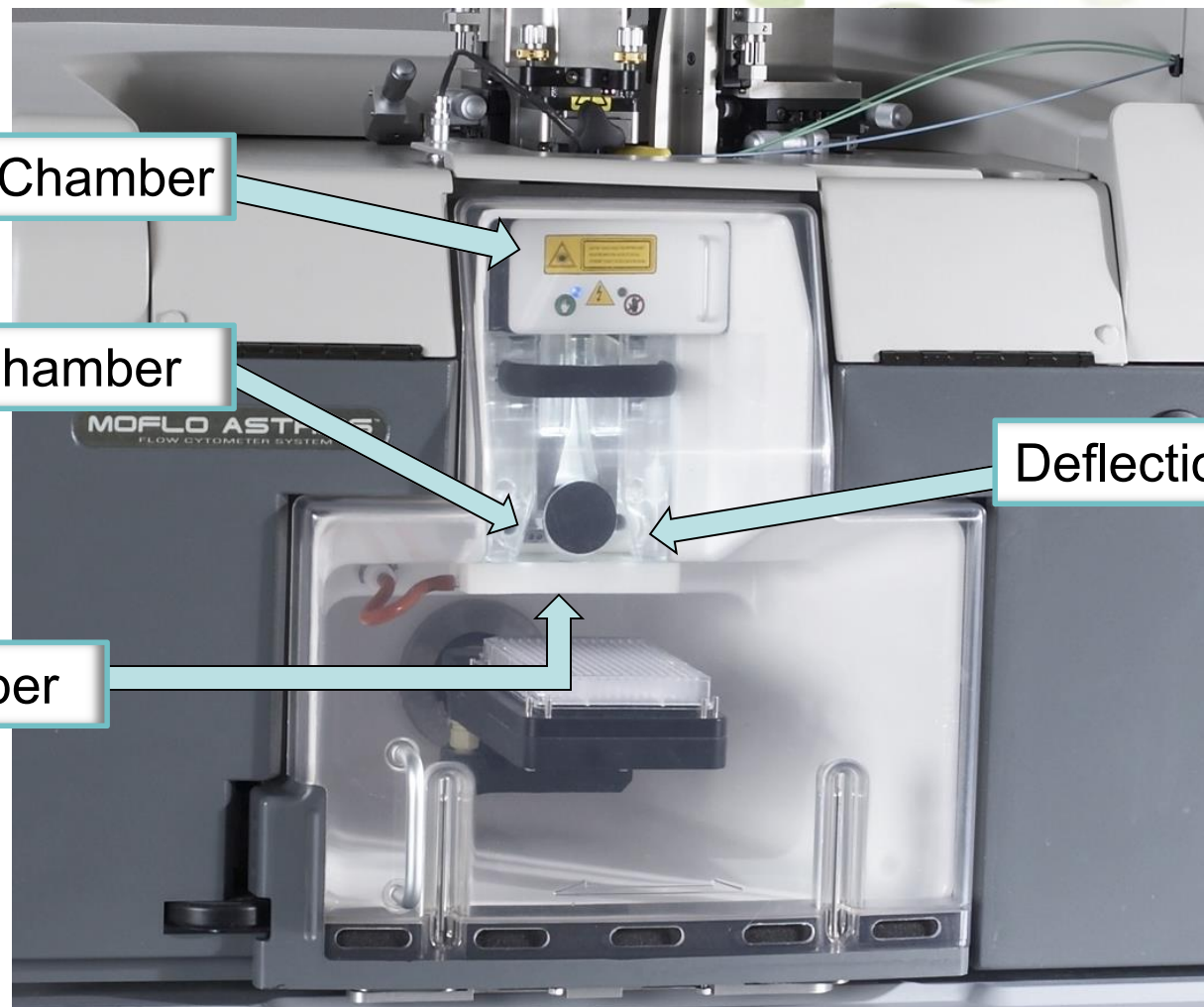


Biosafety – Aerosol Evacuation System

- Aerosols evacuated from three chambers
- Tested to the current ISAC guidelines
- Zero particulates detected outside the chamber



Biosafety – Aerosol Evacuation System Design



Illumination Chamber

Deflection Chamber

Deflection Chamber

Sort Chamber

Biosafety — Sort Rescue

- Sort output protected until sort operation is engaged
- Assures integrity of the sorted product, reducing the need for repeats
- Captures spray in fault conditions
- Under constant vacuum
- Bio-containment assisted by charge plate holder

Sort Rescue



Biosafety — Charge Plate Design

- Eliminates the ability to get shocked
- Easily removable and cleanable design

Charge Plate Handle



Biosafety – BSL II Cabinet

- Tested to NSF-49 standards with the MoFlo Astrios inside
- Touch Screen Control Panel mounted externally
- Most lasers and fluidics are external to the biohood
- Compatible with Aerosol Evacuation System



SmartSampler

- Sample agitation
- Bubble detection
- Temperature control
- Variety of sample input tube size
- Easy access to probe and sample line for changing



SmartSampler – Sample Input



	0.5 ml	1.0 ml	1.5 ml	5 ml	7 ml	15 ml	50 ml
MoFlo Astrios	X	X	X	X	X	X	X
MoFlo XDP	X	X	X	X	X	X	X
Competitor A		X	X	X		X	
Competitor I				X			
Competitor R			X	X			

- Reduce the need for sample aliquoting prior to sorting
- Immediately process your customer's sample without added risk of contamination or spillage
- Greater laboratory efficiency
- Temperature control for all sizes



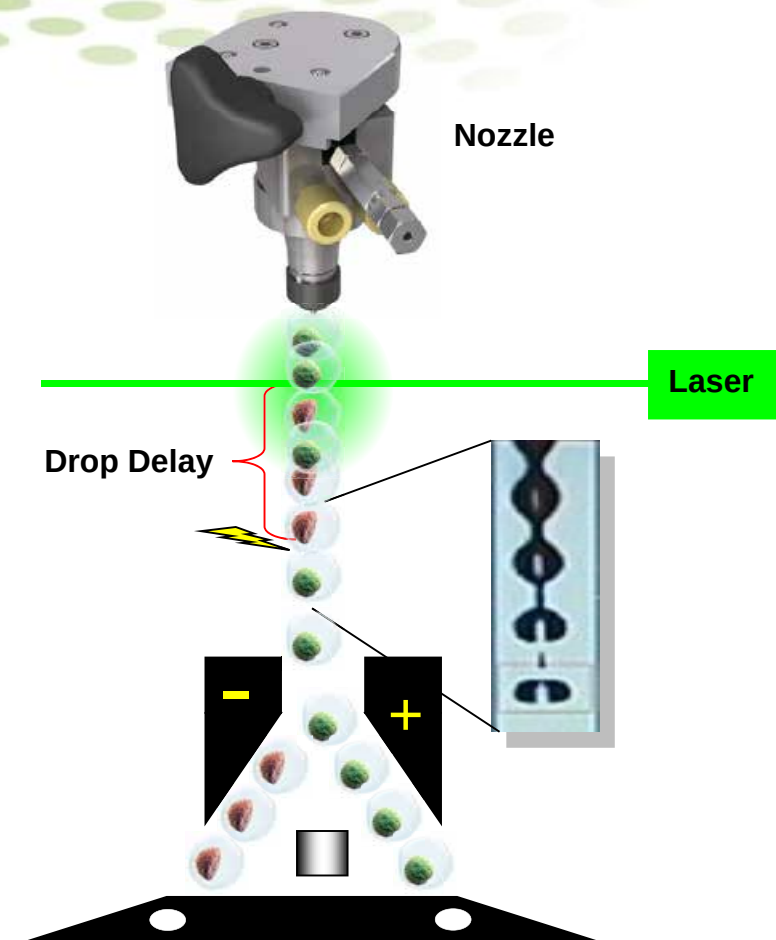
SmartSampler – Control

- Touch Screen Control Panel
- Intuitive operation using Smart Touch technology
- Icons for various functions
- Additional “Help Screens”



Jet-in-Air Nozzle

- Simply faster than cuvette
- When combined with fluidic stability, sort purity and yield, the complexity is not compromised
- 70 μ m and 100 μ m tips compatible with IntelliSort II
- Autoclavable tips



Nozzle Access

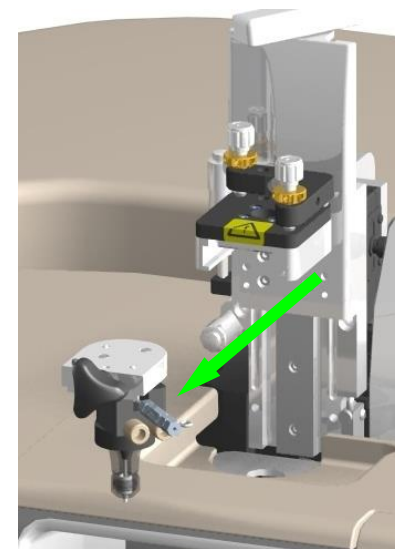
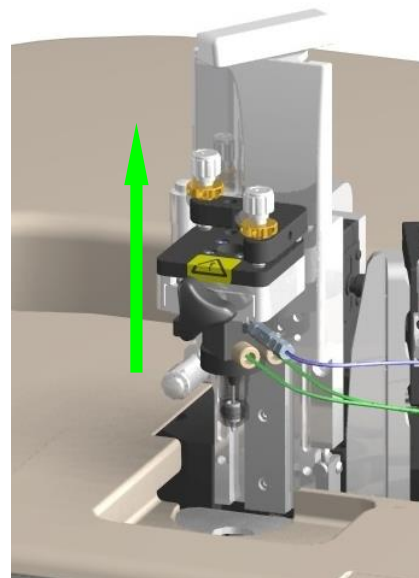
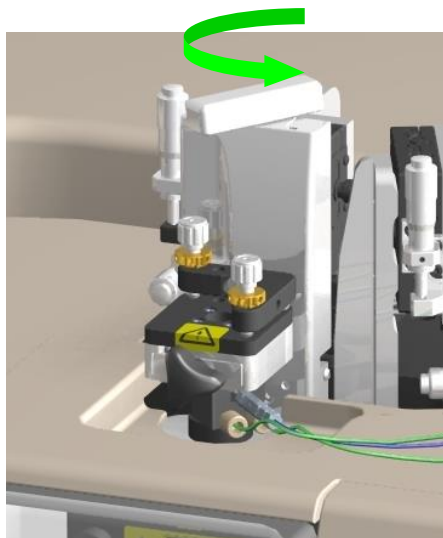
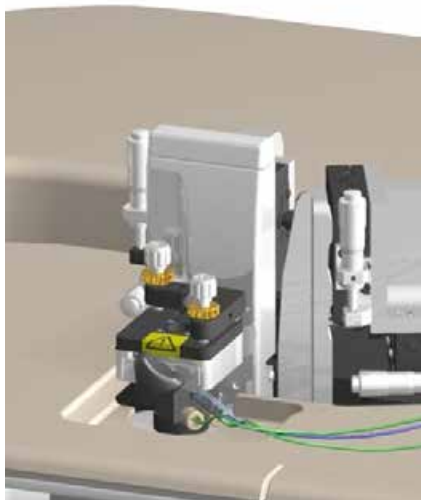
Quick Release Design Simplifies Access



- Change nozzles
- Change tip sizes
- Clear clogs

Nozzle Access

Easy Access for Nozzle Switching and Cleaning



R-Theta CyClone Arm

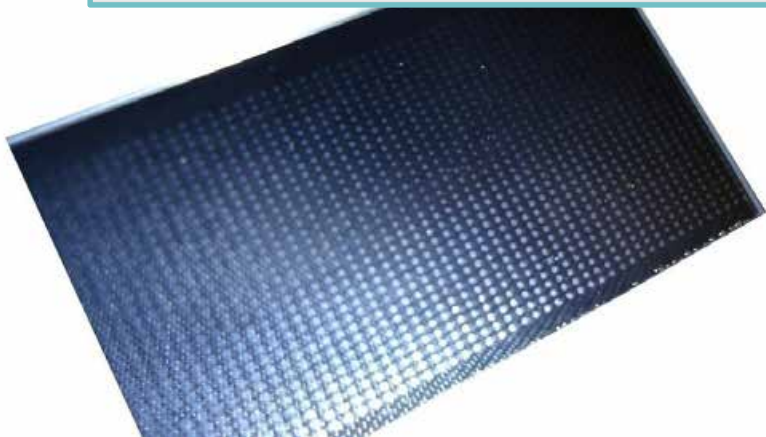
- Design enables a fully sealed sort chamber – ensuring aerosols are not escaping
- Three ranges of motion
- Precision to sort into 1536-well plates



Sorting in up to 1536-Well Plates

- Driven by the fluidic stability of the system
- Capability to sort straight down

Fluorescent beads spotted in 1536-well format onto slide using CyClone arm



Sorting deposition accuracy

6-Way Sorting

- Mixed Mode sorting in any of the six tubes
- User flexibility in experimental design
- Ability to collect your soft aborts for re-analysis
- Independent deflection of each stream



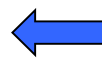
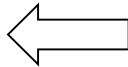
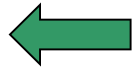
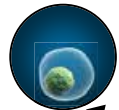
Research flexibility

Sort Mode Capabilities



Droplets

Enrich mode

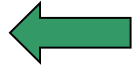
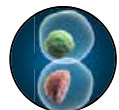
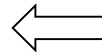


All positive cells are sorted.

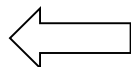
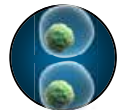


Cells

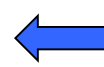
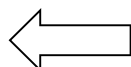
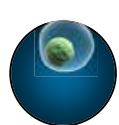
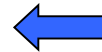
Purify mode



All negative cells are aborted and all positive cells are sorted.



Single mode



All negative cells are aborted and there must be only one positive cell in the drop. This very important mode is used when sorting into 96-well plates.



Positive cell



Negative cell

Single Cell Analysis

Glass slide

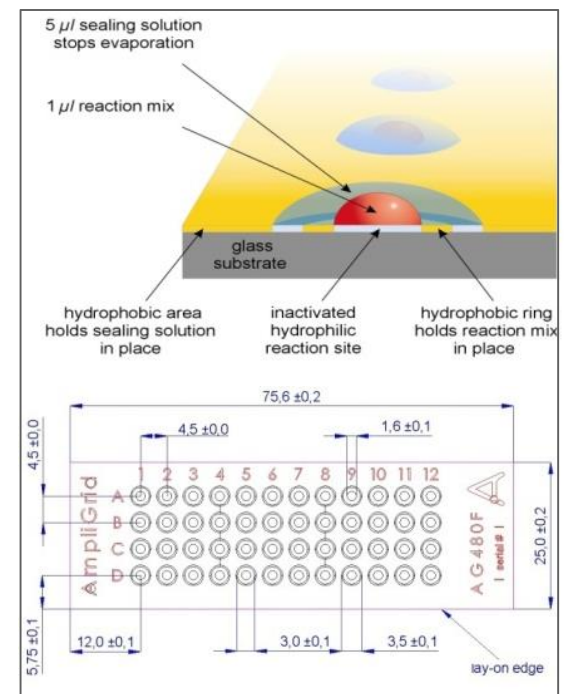
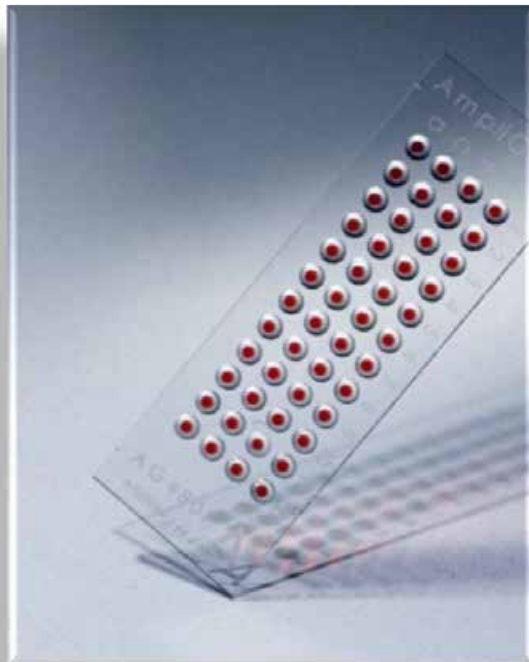
Volume: 1 μ l PCR solution

384-well pitch

Precise optical control

High sensitivity

Automated pipetting



Sort Collection

- Options to meet all sorting needs
- Temperature controlled
- Static dissipative material
- Designed for clean ability
- Quick connects to CyClone arm

Standard Attachments

- 6-way: 5mL
- 2-way: 15mL, 50mL
- 4-way: 3x5mL + 1x50mL
- Plate and slide sorting up to 1536-well plates/spots



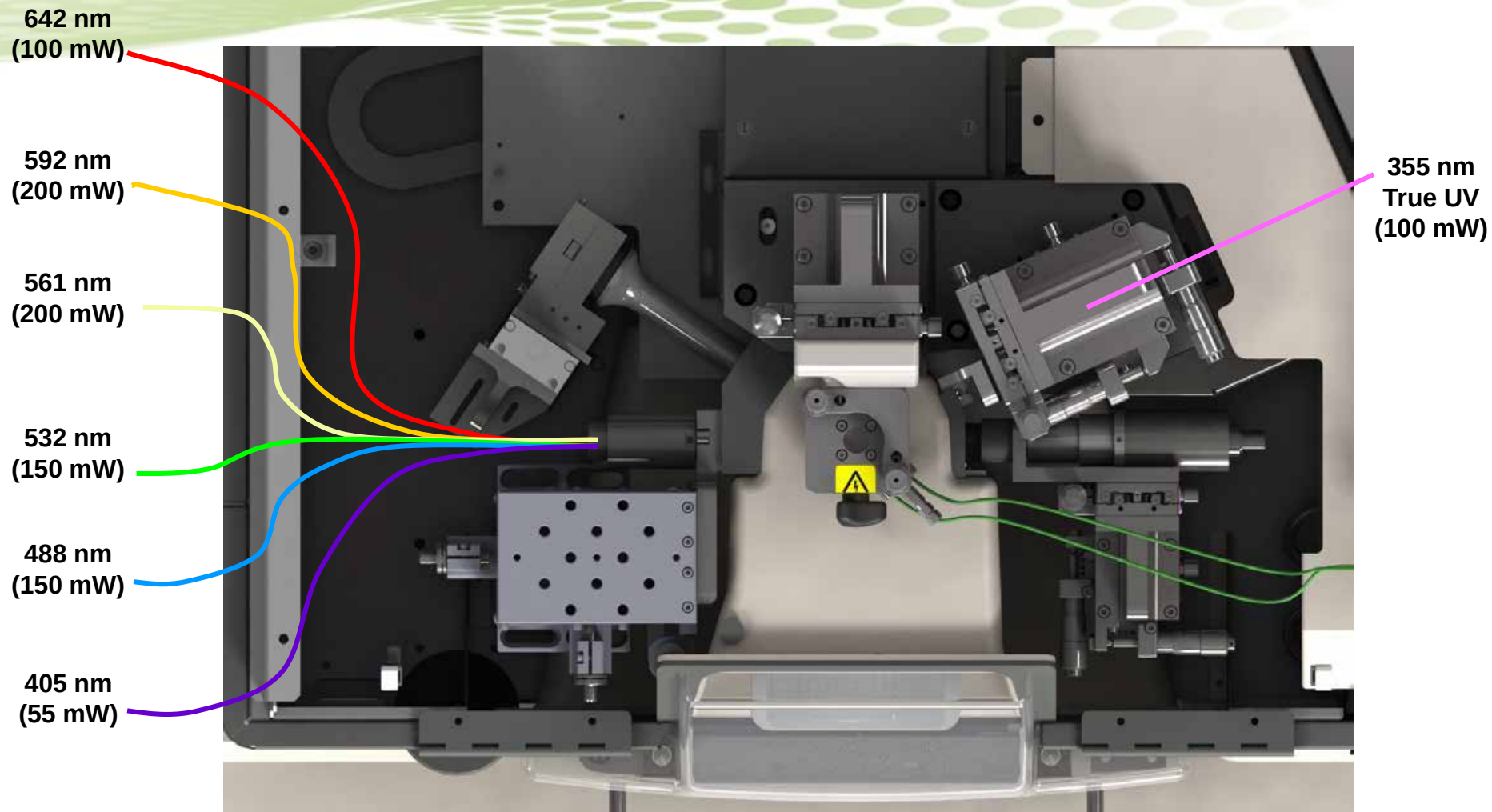
Laser Engine Configurations

- Fiber coupled laser technology
- Facilitates smaller footprint
- Modular and expandable design
- Populate 1 – 6 lasers and expand as your capacity requires



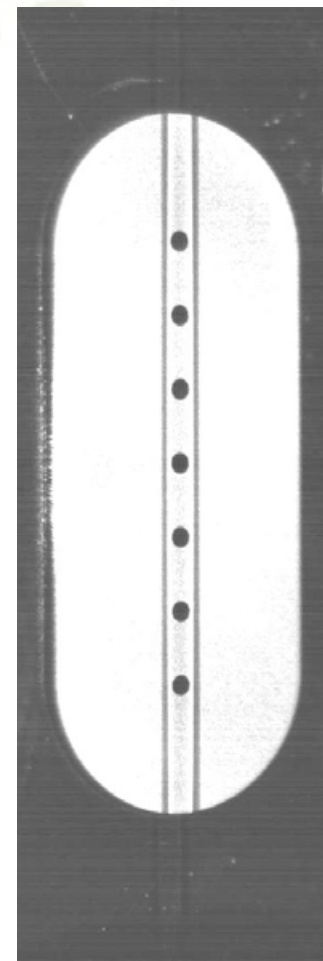
Modularity known to MoFlo

Standard Laser Options



7 Pinholes – 7 Discrete Spots

- Eliminates reconfigurations
 - Move colors without system realignment
- Complex polychromatic sorting
- Reduces need for compensation
 - Spatially separated lasers decrease fluorescence overlap

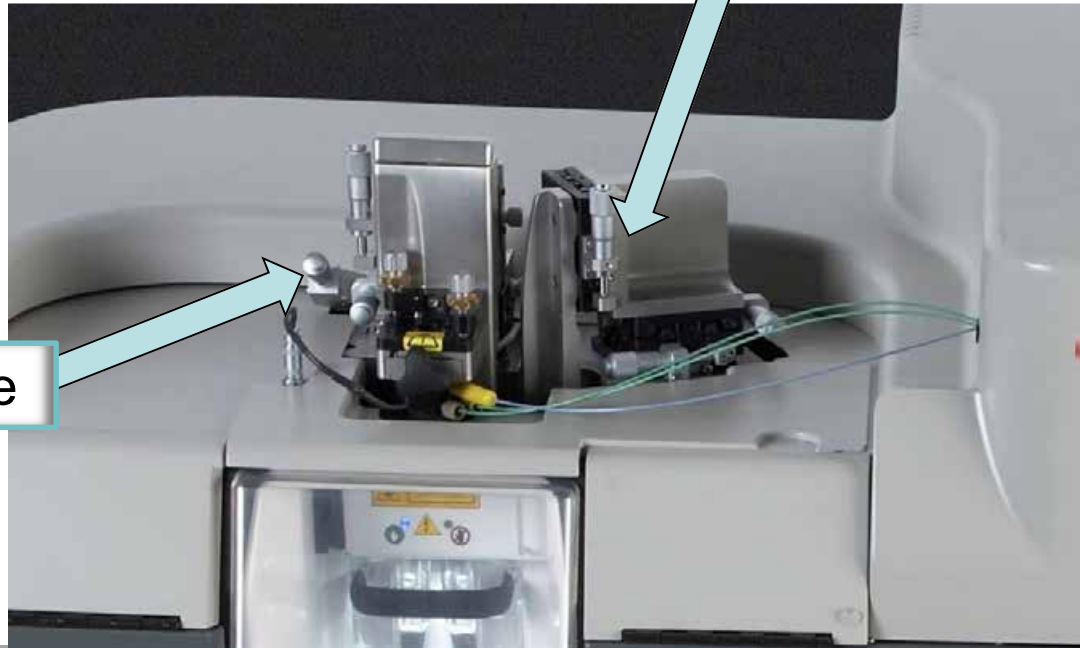


System Alignment

- 7 lasers – 2 alignment stages
- Single multi-fiber BSO
- Flat-top beam profiles on fiber coupled lasers
- 6 fiber coupled lasers coarsely aligned together provide time savings

UV alignment stage

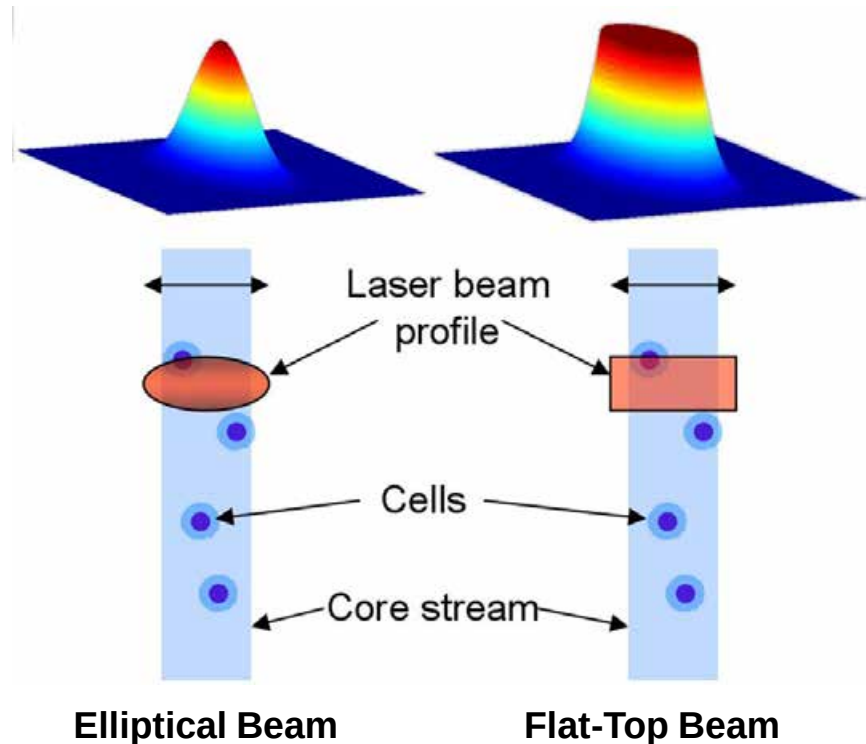
Core stream stage



Benefits of Flat-Top Beam Profiles

Fiber Coupled Lasers

- Flat-Top Beam focuses laser power
- Greater laser power at the stream
- Less sensitivity to laser or core stream shifts
- Alignment simplified



Collection Optics: PODs

- User accessible and configurable
- Software control to power down each POD individually for reconfigurations
- PMT locations recognized
- Single POD for each wavelength
- Five-decade PMT's



Configurable to your detection needs

Collection Optics: PODs

- Positions for 49 PMT's
- Electronics simultaneously collect 32 parameters
- 25mm hard coated filters



MoFlo Astrios Electronics

- 32 bit resolution and 100mHz sampling rate
- Zero Dead Time
 - Equates to the electronics making a proper sort decision every time – regardless of the speed



Sort Speed

100,000 eps analysis

70,000 eps sorting

Zero dead time

Validated specifications

Fluidic stability

Electronic capacity

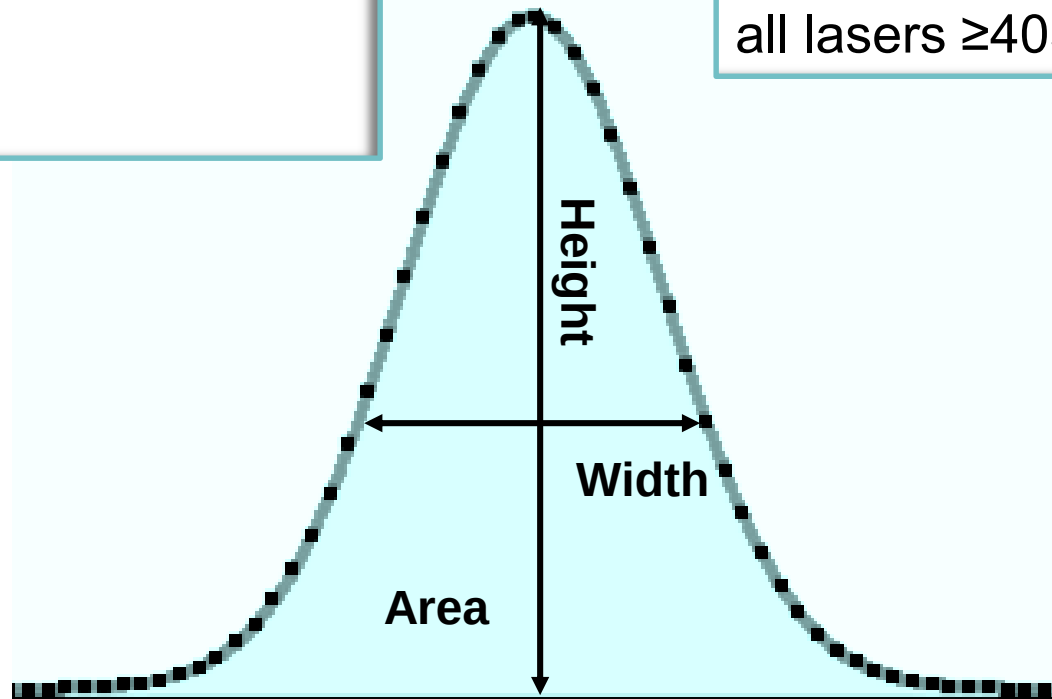


Don't Be Limited with Your Data Collection

Collected for all 32 parameters

- Height
- Area
- Width
- Log
- Log Area

Forward and Side
Scatter available from
all lasers $\geq 405\text{nm}$



IntelliSort II

The only completely bead-less drop delay determination on a sorter

- Three-step process to determine Drop Delay
- Completely bead-less operation
- No fluorescent beads or microscope required
- Fewer foreign particles introduced into the sample line during instrument set-up
- Process takes 3-5 minutes in total



Touch Screen Control Panel

Intuitively designed around daily workflow

- Simplifies cross-training of users
- Visual displays of your instrument's configuration
- Power on/off or shutter lasers
- IntelliSort II operation
- Real-time sort statistics
- Responsiveness to touch



Smart Touch technology for your sorter

Touch Screen Control Panel



Touch Screen Control Panel: Auto QC

- Track and trend analysis for proactive performance monitoring
- Sets laser delay for all lasers
- Adjusts PMT voltage to put peaks in channel 128
- Compares CV's and PMT voltages to pre-determined (yet configurable) values



Sorter performance tracking system

Touch Screen Control Panel



Touch Screen Control Panel



Screen Element	Function
Sort tab 	Press to access the Sort screen.
Sort Output Type 	Use the drop-down list to select a Sort Output Type. Standard Sort Output Types: 6-well, 24-well, 96-well, 384-well, and 1536-well microplates (or custom) 5mL, 15 mL, 50 mL, and 50mL with 5 mL tube holders Slide
Create New 	Access the Definition screen and create a new Sort Output Type.
Copy 	Access the Definition screen and create a copy of a standard Sort Output Type that can be edited.
Edit 	Access the Definition screen and edit a previously saved Custom Sort Output Type.
Delete 	Deletes custom Sort Output Type.
IntelliSort Initialize 	Sets drop drive frequency, amplitude, and charge phase.
IntelliSort Drop Delay Determination 	Performs automated drop delay determination. (Before pressing this button, view the streams image and adjust charge phase if necessary.)
IntelliSort Maintain 	Starts IntelliSort Maintain Mode, which can monitor a sort and maintain drop delay within 10% for a temperature change of ± 3 degrees Celsius for a sheath pressure change of ± 1 psi.
Manual Droplet Setup 	Press this button to access the Droplet Setup screen. Note: This screen is necessary only when you intend to set up a sort manually. If IntelliSort is maintaining the drop delay some of the controls on this screen will be disabled.
Stream Setup 	Press this button to access the Stream Setup screen and: - Set Charge Phase during IntelliSort II setup. - Set up a sort manually. - Adjust deflection for sort output - Adjust plate voltage

Auto Start Up

- Schedule your instrument to turn on the next day
- Determine a time to initiate the instrument
- Powers-on desired lasers
- Pressurizes fluidics
- Instrument is ready for alignment and IntelliSort II immediately upon arriving in the morning

Initiation to start sorting in 10 minutes
when Auto Start Up is engaged



MoFlo Users Group

- MoFlo XDP
- MoFlo Astrios

Online forum
especially for MoFlo
customers to discuss
applications and needs

Welcome to the Beckman Coulter Community. Please visit our forums.
www.coulterflow.com [Beckman Coulter Discussion Groups](#) [Beckman Cou](#)

Go New Find Tools Admin

Welcome!

User Groups (Private)
A restricted forum area for owners of our system solutions and selected beta groups.

Forum	Topics	Posts	Las
 CyAn™ ADP Users Group	23	53	
 MoFlo® Users Group	385	1184	
 MoFlo® XDP Users Group MoFlo XDP discussion group.	6	8	
 Summit 4.3 This forum lists Summit 4.3 information for both the CyAn and the MoFlo.	20	52	
 MUG Archive MUG archives through September 2001. Please post to MUG forum above.	197	912	

Other Forums

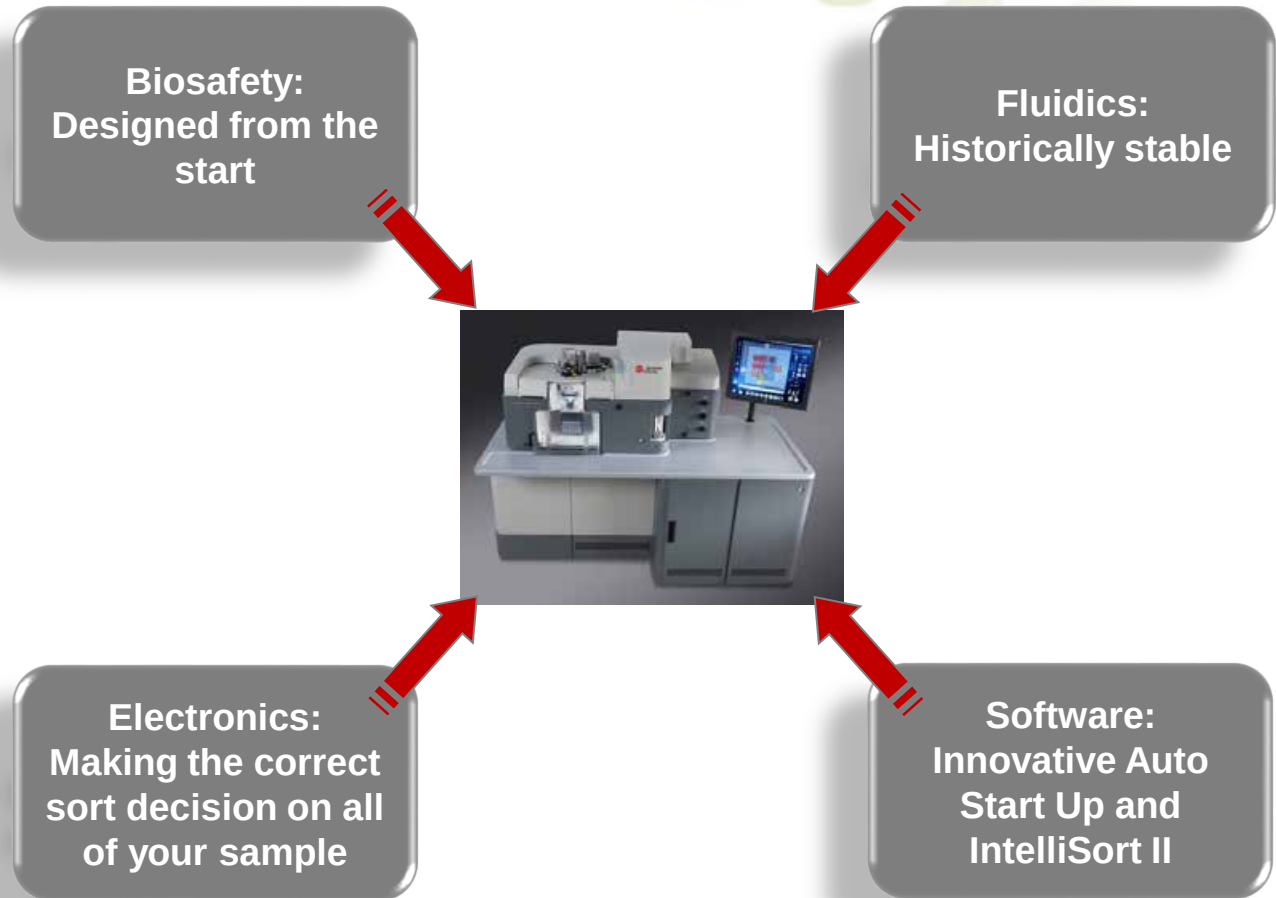
Forum	Topics	Posts	Las
 Bulletin Board Features, Q&A Use this forum for general BBS features discussion and Q&A.	6	14	

Powered by Social Strata

www.coulterflow.com [Beckman Coulter Discussion Groups](#) [Beckman Cou](#)

<http://discussion.coulterflow.com/eve/forums>

MoFlo Astrios: Complete Sorting Package



MoFlo Astrios Features

- IntelliSort II: completely bead-less drop delay determination and monitoring
- Biosafety considered from the start
- 6-way sorting
- Viability known to Jet-in-Air sorters
- Speed unmatched – correlates to lab throughput
- BSL II solutions certifiable upon installation
- Proven electronic performance
- Fluidic stability required for sorting



www.coulterflow.com or www.MoFloAstrios.com