



Raman Spectroscopic Bioprocessing Solutions

a partnership in application development

Today's Presenters



Eric Ferree

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Roles

Product Design Solutions

- Solving the Mechanical Challenges of Building Precision Optical Products
- Agile Response to Dynamic Projects
- Full Product Lifecycle Support
- Located in Central Florida since 2001
FPC Member since 2009



Kaiser Optical Systems

- Leader in the Industrial Raman-based Composition Analysis Market
- Deep IP in Raman Spectroscopy
- Portfolio of Systems, Analytical Methods, and Software
- Division of Endress+Hauser
Offices in Ann Arbor, Michigan



Kaiser Raman bioprocessing solutions

- Measures *many* bioprocess parameters – a key enabler of in-process, real-time bioprocess monitoring, control, and optimization.
- Transferable from development to cGMP, small to large scale, and reusable to single-use bioreactors.
- Provides bioprocess **Efficiency** and **Optimization**:
 - High ROI through process automation
 - Reduced bottlenecks and analytical wait times
 - Improved patient outcomes through process improvements

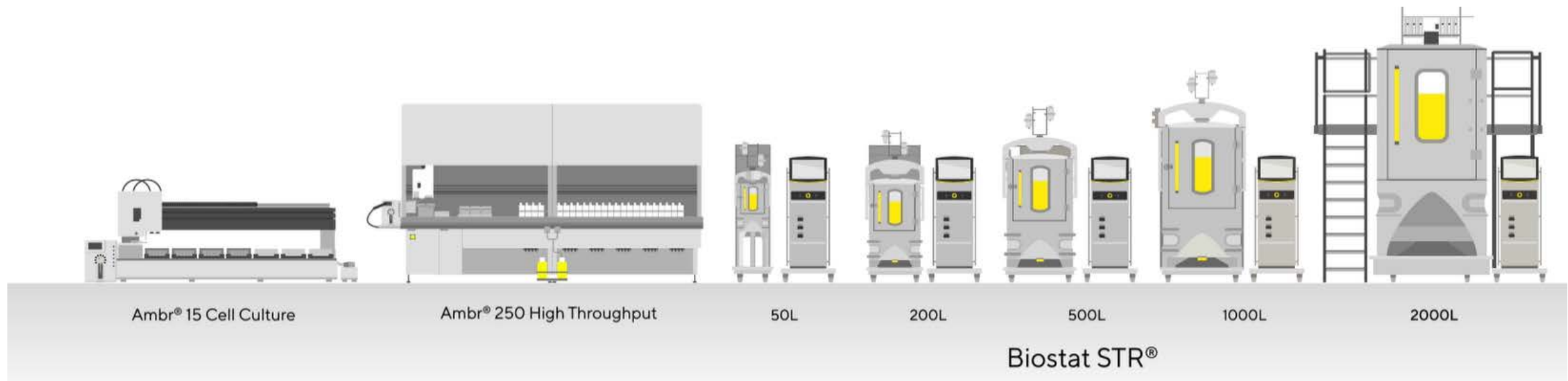


BioPAT[®] Spectro was designed to meet three key requirements

- Enable Raman spectroscopy in high throughput process development
- Facilitate and improve the model building process
- Enable full single-use integration and scalability for commercial manufacturing

'... the next killer app for Raman as it enables the technology to expand beyond manufacturing and into PD. ...'

Aspen Alert, March 2020



BioPAT[®] Spectro introduces Kaiser Raman into Ambr[®] and Biostat STR[®]



Parallel Path Development

Product Design Solutions



Device
Development



End-User and
Design Focus



Requirements
Validation



Release to
Production

Kaiser Optical Systems

Whole Product
Development



Market and
Customer Focus



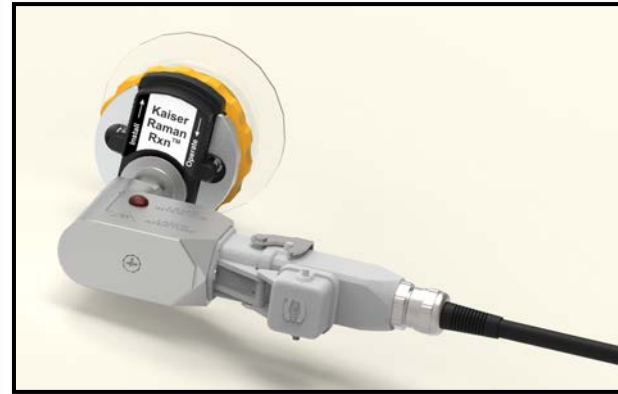
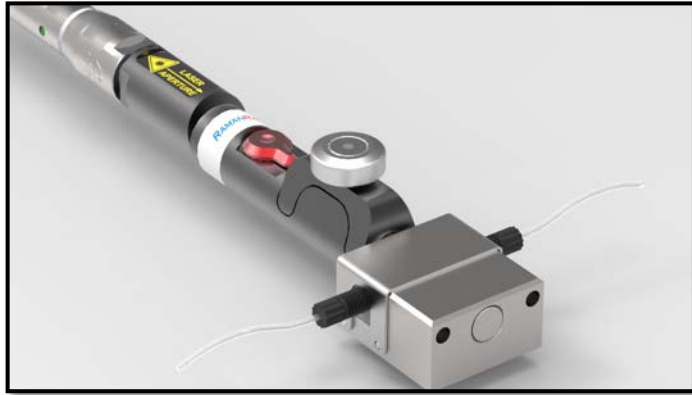
App Qualification
and Validation



Technical Core IP
Development



Device Development



Feasibility

Prototype

Pilot

Production

Device Demonstration



Parting Shots – Our “Ask”

Product Design Solutions

- Building awareness
- Looking for new clients and projects
- Becoming more active in the community and local economy
- Exploring expansion into low volume manufacturing
? ISO 13485 assistance ?

Kaiser Optical Systems

- Building awareness
- Looking for new clients and applications
- Recruiting a new Photonic Engineer

Follow Up After the FPC Tech Showcase:

Eric Ferree

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