



SampleBus Advanced Autosampling for Ambr[®] 250 HT Multi-Parallel Bioreactors



"Ambr[®]" is a registered trademark of "The Automation Partnership (Cambridge) Limited"

Built on the back of Securecell's own Integra1 64 high-throughput development, we have discovered a seamless* automated flow to continuously sample each bioreactor of up to six Ambr® HT 250 systems four times every 24 hours.

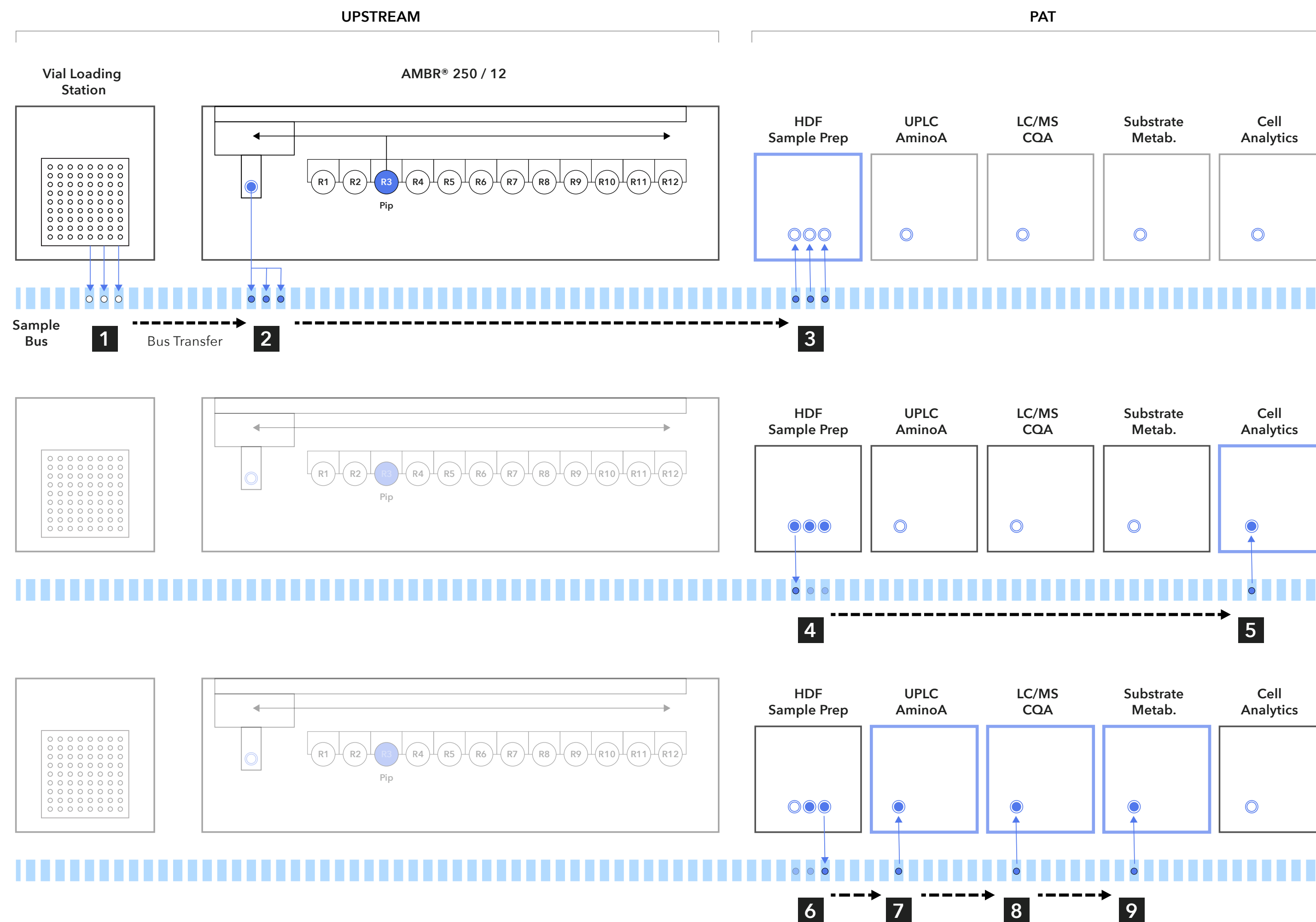
This highly customizable solution delivers the ultimate control together with Siemens PLC and Lucillus Bioprocess SCADA. This set-up works day and night with the industry's top analyzers to achieve the highest level of insight for process development and optimization for your Ambr® 250 systems.

The SampleBus connection to the Ambr® system only utilizes the openly accessible and documented OPC interface in order to synchronize the sampling process.

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Ambr® 250 HT SampleBus Autosampling Process

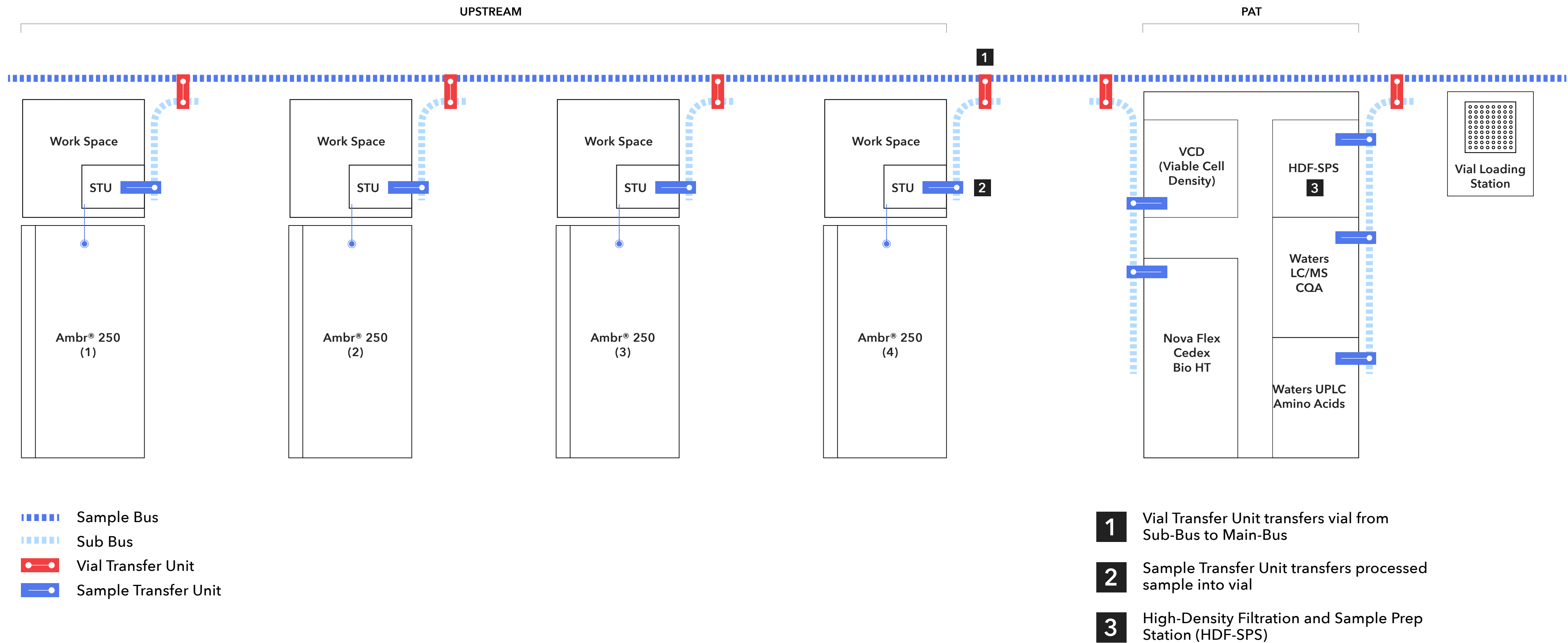


Ambr® 250 HT SampleBus Process Flow

- 1** Load 3 empty vials on conveyor belt
- 2** Sampling process: transfer 1.5ml sample into one vial via Sample Transfer Unit
- 3** Transfer sample vial and two empty vials Into High Density Filtration / Sample Prep Station
- 4** Return sample vial with 0.5ml Cell Suspension to conveyor belt
- 5** Transfer suspension sample to Cell Analytics (vortex, dilution)
- 6** Transfer cell free sample (0.8ml) to conveyor belt
- 7** Deliver 100ul sample to UPLC Amino Acid Analyzer
- 8** Deliver 100ul sample to CQA Product Analyzer
- 9** Deliver 500ul to Substrate Analyzer (glucose, lactate, NH₄, ions,

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Example: 4 Ambr[®] 250 HT Systems Connected by SampleBus and Sub-Bus to Analytics



HDF-SPS (High Density Filtration and Sample Prep Station)

- | | |
|--------------------------|---------------------------------------|
| 1 Sample Sub-Bus | 9 Vial magazine at 4°C |
| 2 Rotary gripper | 10 Vial magazine at 37°C |
| 3 2D-Code scanner | 11 Vial magazine at 80-90°C |
| 4 Centrifuge | 12 Vial Magazine at room temp. |
| 5 Vortex mixer | 13 Counterweights |
| 6 Scale | 14 Portal robot |
| 7 Syringe 5 µl | 15 Waste bin |
| 8 Syringe 1 µl | |

Key Features:

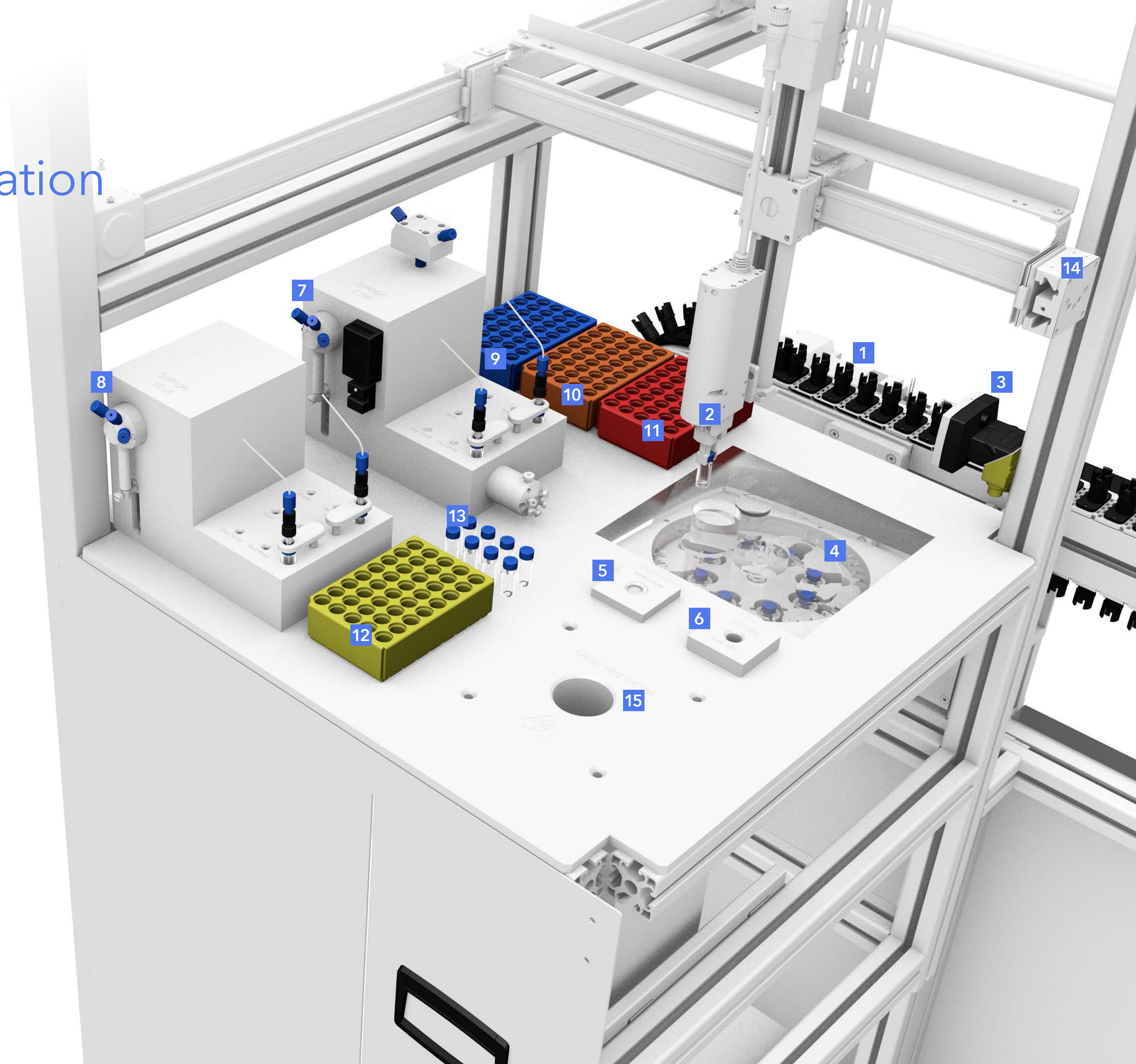
Sampling via Ambr® 250 HT < 2ml into SEC cell (qualified in Numera project)

Centrifugation for cell and debris removal
2000g - 10,000g

Optional final Filtration via Sephara™ Membrane (yield 1.0 ml)

Any Cell Concentration up to 200 million cells per ml can be filtrated with exceptional yield of supernatant

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It's Time to Update Your Algorithms

Up to 6 Bioreactors from 6 Ambr[®] 250 HT systems
can be sampled in parallel

Each bioreactor can be sampled every 6 hours or
4 X per day (8 X per day is possible with
additional analytical equipment*)

Compatible with most analytical systems on the
market (Cedex[®], UPLC/LCMS, Nova FLEX, etc.)

*Ultimate measurement frequency determined
by analytical throughput

Low Volume is Key

Sampling relies on Sephara™ Membrane technology

Highly reliable filtration behavior

1200 Filtration cycles proved with CHO cell fermentation

Pore sizes: 0.4, 1.0, 2.2, 4, 8, 12, 16, 20, 24, 28, 32 micrometers

Quantifiable filtrate amount from 100 uL to 1 mL in steps of 10uL

Sephara™ Membrane Technology allows 24 Samples a day per Bioreactor at working volumes of 150 ml and less

Sephara™ is integrated in HDF Module to guarantee total cell free supernatant after centrifugation



Structure of Vial Holder

Each vial holder has several functional attributes that allow you to insert, transport, unload and remove vials from the structure.

Along conveyor belt, several functional stations can be allocated to serve different functions including loading, unloading, and sample transfer.



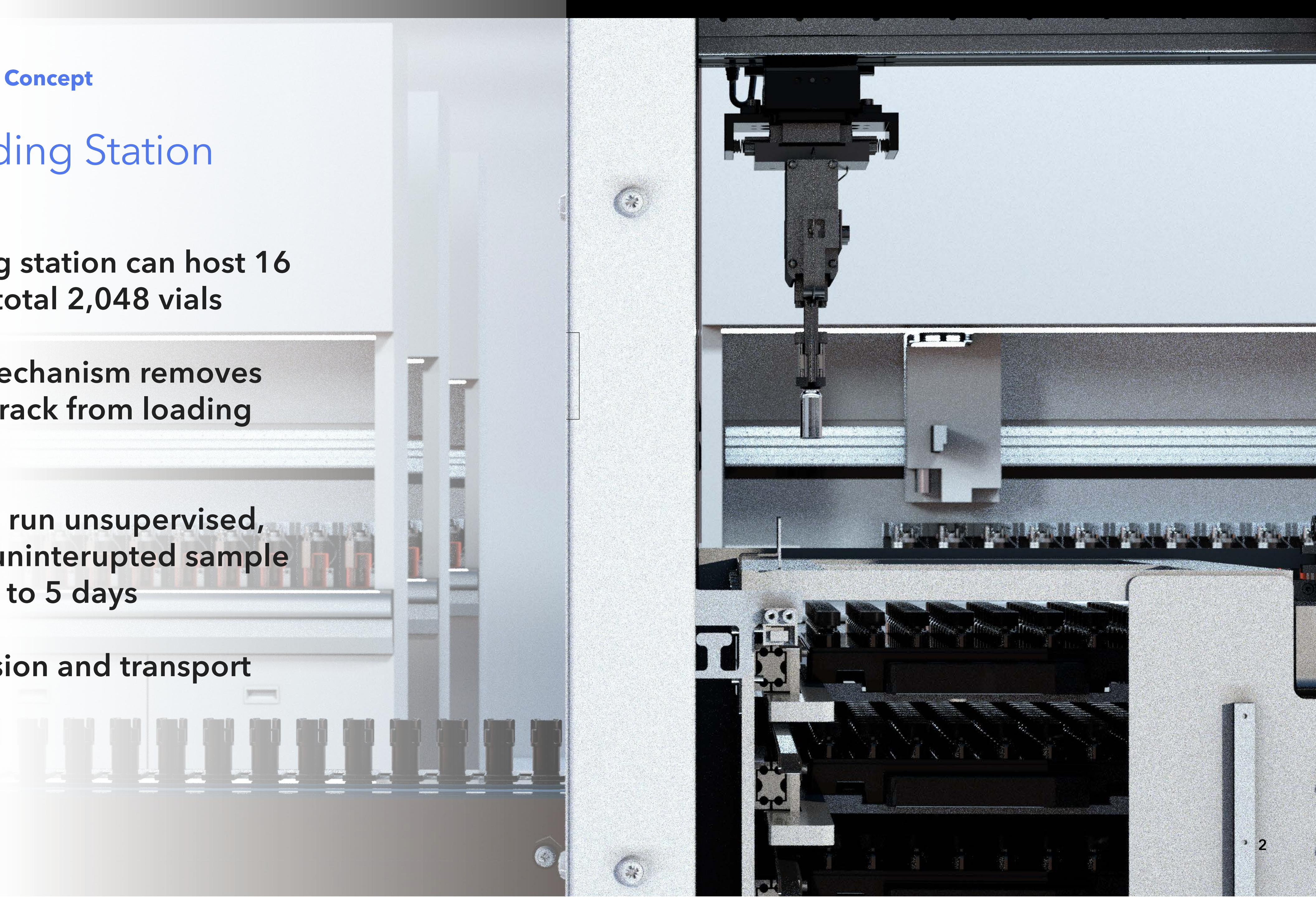
Vial Loading Station

The loading station can host 16 racks with total 2,048 vials

Elevator mechanism removes exhausted rack from loading position

Station can run unsupervised, providing uninterrupted sample vials for up to 5 days

High precision and transport security



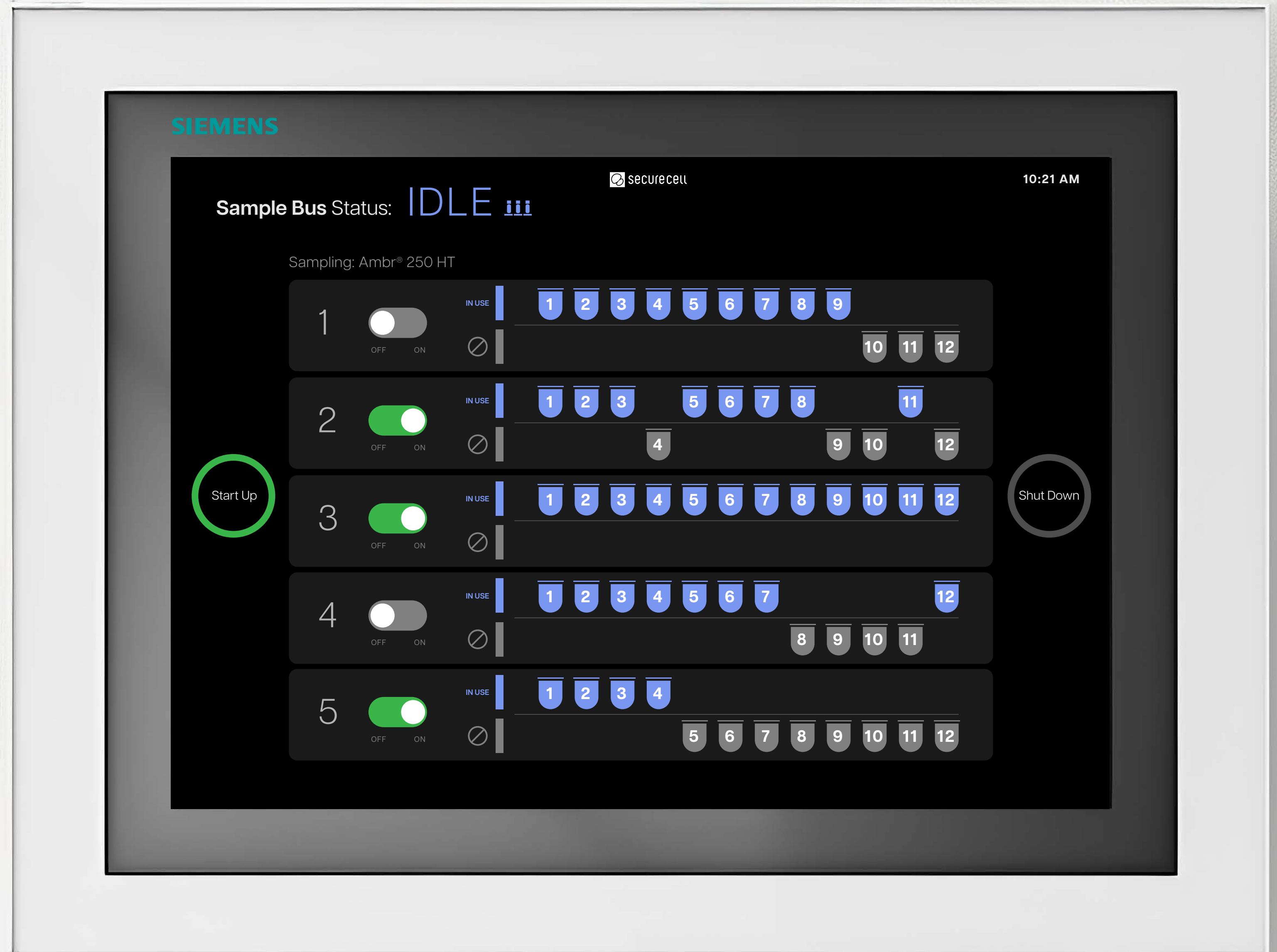
Local Interaction

Simple, intuitive, powerful control at your fingertips.

Siemens® Panel

No Planning necessary. All managed by implicit rules

Lucillus-Interactions limited to administrator access





Authentic Automated Biotechnologies



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