

Streamlining Sample Storage and Retrieval with SampleAtlas

Technical Implementation
for Snorkel Automated ULT
Freezers





Automated Sample Management Transformation

In the field of research and development in the life sciences, the integrity and traceability of samples significantly impact the quality of outcomes. However, the traditional ULT (ultra-low temperature) sample storage methods have consistently posed challenges for researchers. These include repeated freezing and thawing due to manual handling, as well as problems like sample cross-contamination and insufficient operational traceability stemming from inadequate rights management.

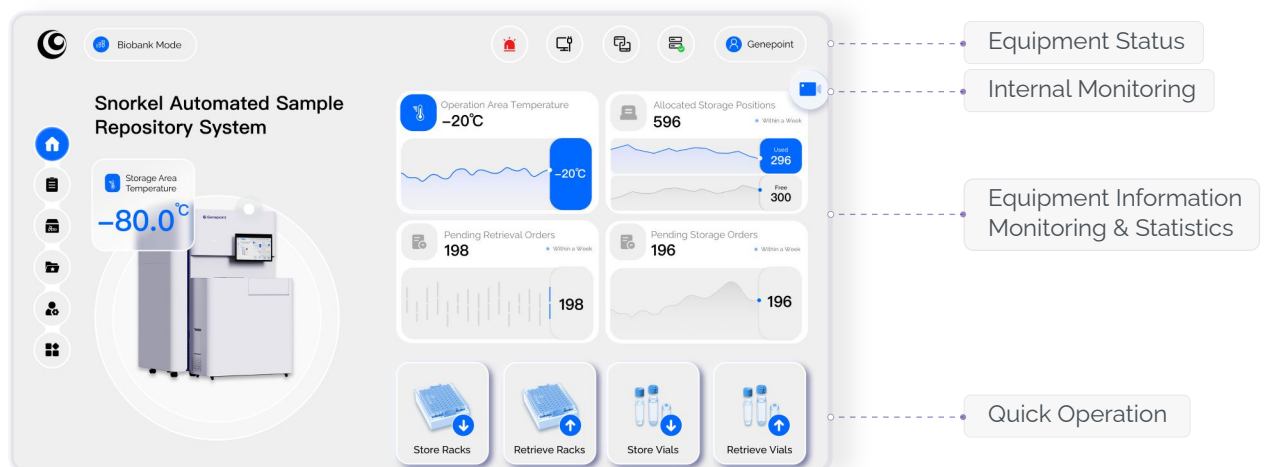
SampleAtlas is the operational management software designed for the Snorkel automated -20°C / -80°C lab freezer. It advances from "manual storage" to "process control" through technological innovations, offering essential support for standardized research and industrial applications.



Benefits of Automated Storage Management Software

SampleAtlas is designed for diverse industry applications, offering a suite of innovative, collaborative and personalized management features that deliver outstanding results:

- Ultimate convenience with a consumer-grade user experience
- Powerful preinstalled and plug-and-play
- Highly compatible with a wide range of application scenarios
- Greatly enhanced sample integrity and traceability



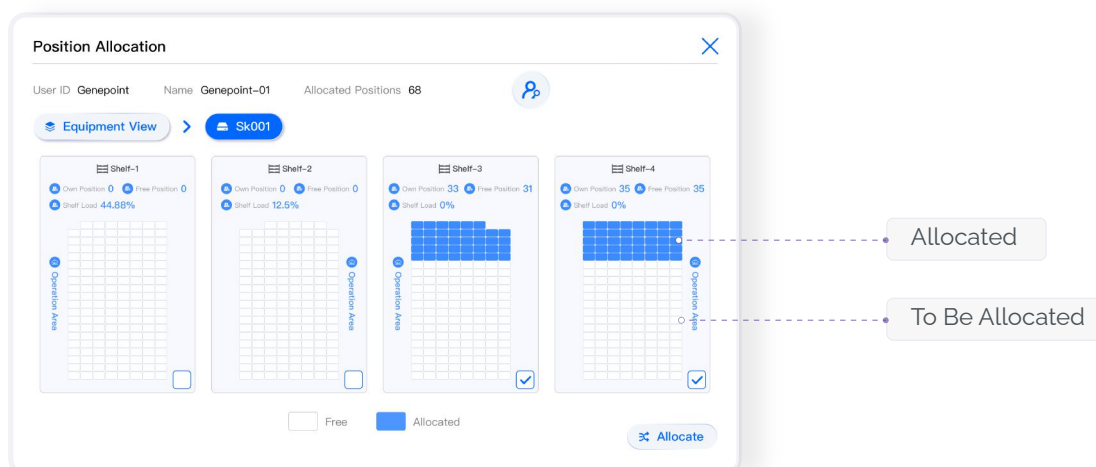
SampleAtlas is ready to use immediately after startup in a standalone environment. Additionally, whether managing a single Snorkel, multiple Snorkels across a network, or integrating with a Laboratory Information Management System (LIMS), Snorkel provides rapid response and precise control, enabling intelligent sample management.



Streamlined Equipment Sharing and Collaborative Operation

To facilitate multiple laboratory personnel sharing the same freezer, as well as support multi-user collaboration and verification, SampleAtlas provides advanced permission management features.

- 1 Access Rights Restriction:** Limit users to viewing and managing samples only within their authorized locations, thereby preventing unauthorized access to secure areas.
- 2 Rack-Level Permissions:** Support storage locations with a minimum allocation unit of a single rack, ensuring that only authorized personnel can operate within designated storage areas.



- 3 Multi-User Shared Access:** Allow multiple lab personnel to access the same storage location simultaneously, enabling effective collaboration on shared projects.
- 4 One-Click Permission Replication:** Copy permission settings from one location and apply them to others with a single click, minimizing repetitive configuration tasks.
- 5 Collaborative Order Allocation:** Enables the assignment of sample storage and retrieval orders to other users for joint execution.

- 6 Dual-Person Retrieval Verification:** After enabling this function, samples can only be released once two authorized individuals have independently verified their identities.



Complete Sample Information Records

To ensure full traceability throughout the handling process, SampleAtlas provides features supports compliance with 21 CFR Part 11., including comprehensive records and imaging/video documentation during storage and retrieval:

- 1 Racks/Tubes Life-Cycle Data Recording:** Data for each rack and tube is recorded, including sample ID, storage and retrieval times, changes in storage location, operators involved, and other relevant details.
- 2 Operation Log and Alarm Information Recording:** All equipment-related operations and alarm information are recorded in real time, including permission settings, parameter adjustments, temperature anomalies and sensor faults, etc.
- 3 Dual-Temperature Zone Data Recording:** SampleAtlas independently and continuously collects and records temperature data for both the storage and operation areas of the Snorkel, generating a continuous temperature curve.
- 4 One-Click Export of All Records:** All recorded data can be exported with a single click, including life-cycle history, operation logs, alarm information, and temperature data—can be exported with a single click.
- 5 Top-View Snapshots Taken During Storage (Snorkel & Snorkel Max Only):** These images help locate and identify non-standard consumables, preventing freeze-thaw damage to samples caused by repeated searching and handling at ambient temperature.
- 6 Operation Videos Recorded During Tube-Picking (Snorkel Pro & Snorkel Pro Max only):** Automatically recorded videos are retained for up to 7 days; Failure alarm videos are saved permanently.
- 7 Storage Area Monitoring Video:** Supports real-time viewing and can be stored for up to 7 days; Failure alarm videos are saved permanently.



Effective Management Tool

SampleAtlas provides a defragmented storage space combined with low-temperature automated inventory management to optimize the efficient use of Snorkel and reduce biosafety risks:

- 1 Fragmentation Rate Monitoring:** Track idle space dispersion in real-time to assess reorganization needs and avoid unnecessary layout changes.
- 2 Automated Defragmentation:** Consolidate scattered samples into centralized locations to free up idle space and improve utilization.
- 3 Flexible Inventory Methods:** Select either rack-level or tube-level inventory to best suit your workflow.
- 4 Automated Low-Temperature Inventory:** Conduct complete inventories in a fully automated, low-temperature environment.



Easy Switching Between Strict and Flexible Management

SampleAtlas offers both Biobank and Research modes, which can be switched with a single click. This flexibility accommodates different usage scenarios and simplifies user operations.

1 Biobank Mode (Strict Management Mode)

Biobank mode is perfect for situations that demand strict control over sample storage and retrieval, operation traceability, dual-person verification, and management of large sample volumes. It provides the following features:

- A mandatory recheck of storage control is required.
- Dual-person verification is optional.
- Automatic tube-picking operation (available only on Snorkel Pro and Snorkel Pro Max).

This mode is commonly used by large biobanks, extensive cohort research centers, disease control centers and specialized laboratories.

2 Research Mode (Flexible Management Mode)

Research mode is ideal for scenarios where multiple individuals or groups share a single freezer, management is relatively relaxed without the need for frequent rechecks, and quick access to non-standard consumables is essential. It provides the following benefits:

- Supports fast sample handling operations without the need for manual information input.
- For SBS racks model: Compatible with whole-rack handling operations for microplates, deepwell plates and other custom consumables meet the footprint dimensions for microplates (ANSI SLAS 1-2004)
- For cryo boxes model: Can be used with common cryobox dimensions (133*133mm) or Snorkel's adaptor box serving as an adapter for storing paper boxes.

This mode is commonly used in hospital central laboratories, translational medicine laboratories, and for small sample testing within individual departments.



Extensive Consumable Compatibility

SampleAtlas supports the storage of both standard and non-standard consumables.

- 1 **Automated Rack Access for Non-Standard Consumables** (available in Research mode only): Consumables that do not fit into standard racks, such as ampoules, can be accessed automatically as complete racks using a dedicated Genepoint adaptor box, enabling organized storage.



Genepoint Adaptor Box with Dividers

- 2 Personalized Visual Diagrams of Consumable Arrangements:** SampleAtlas provides personalized consumable specifications and well layouts, enabling precise sample localization and supporting personalized storage needs.

Order ID: SK001DR250207-001 | Order Type: Store Rack | Sample Management Mode: Biobank Mode

Collaborator: Select collaborator | Secondary Venter: Admin | Order Notes: Order notes | Remaining characters: 500

Rack ID: GA004 | Rack Type: SBS Rack | Rack Layout: 12 * 8 | Position: SK001 1-1-6-21 | Occupied Hole: 1 | Rack Notes: test data | Remaining characters: 491

Vial ID: GA004001 | Vial Type: Genescript (mL) Black... | Hole: A1 | Vial Notes: test data | Remaining characters: 491 | User-Defined Fields

Buttons: Save, Store Rack, Batch Scanning Entry Vials

Callouts: Order Information, Tube Information, Rack Information

Powerful Customization and Personalization Options

To meet the varied sample information management requirements of different studies and laboratories, SampleAtlas provides customizable sample attribute fields and functional settings. This ensures flexible and secure recording of sample data, as detailed below.

- 1 Personalized Field Settings and Flexible Display:** Non-fixed fields can be personalized and are visible to all authorized accounts. Operators can choose to show or hide fields as needed to keep the interface simple and clear.
- 2 Custom Session Timeouts:** Define personalized duration limits for sample access and system inactivity.

Biobank Mode | Genepoint

Personal Account | Cluster Account

Genepoint | Edit Name | Has been using Snorkel for 16 days

Sample Management Mode: Virtual Keyboard | Rack Read

Auto Logout Duration: 0 | Countdown To Storage or Retrieval Vial Closure: 30S

Own Position Numbers: 66 | Number Of Racks In Storage: 2 | Number Of Vials In Storage: 48

Buttons: User-Defined Consumables, User-Defined Fields, Change Password

Callouts: Personal Reference, Authorized Sample Data Statistics

- 3 Custom Fields:** Create fields like "Sample Source" or "Experiment Batch" to fit the specific needs of project.
- 4 Multiple Data Types:** Select various data types (e.g., text, date, notes) for a variety of scenarios to ensure accurate data entry.
- 5 Flexible Login Options:** Log in using facial recognition or the account password.



Model and Function Comparison Table

	Rack-Based Models		Tube-Based Models	
	Snorkel	Snorkel Max	Snorkel Pro	Snorkel Pro Max
Rack-Based Handling	●			●
Tube-Based Handling	○			●
File Format Data Import	●			●
Dual-Temperature Zone Monitoring	●			●
Dedicated Storage Space	●			●
Reserved Retrieval	○			●
Inventory Management	●			●
Compatibility with Non-Standard Consumables	●			●
Defragmentation with Automatic Tube Picking	○			●
Assisted Defragmentation (Manual Picking Required)	●			○
Operation Monitoring Video	●			●
Intelligent Reverse Tube-Picking*	○			●
Dual-Person Verification for Retrieval	●			●

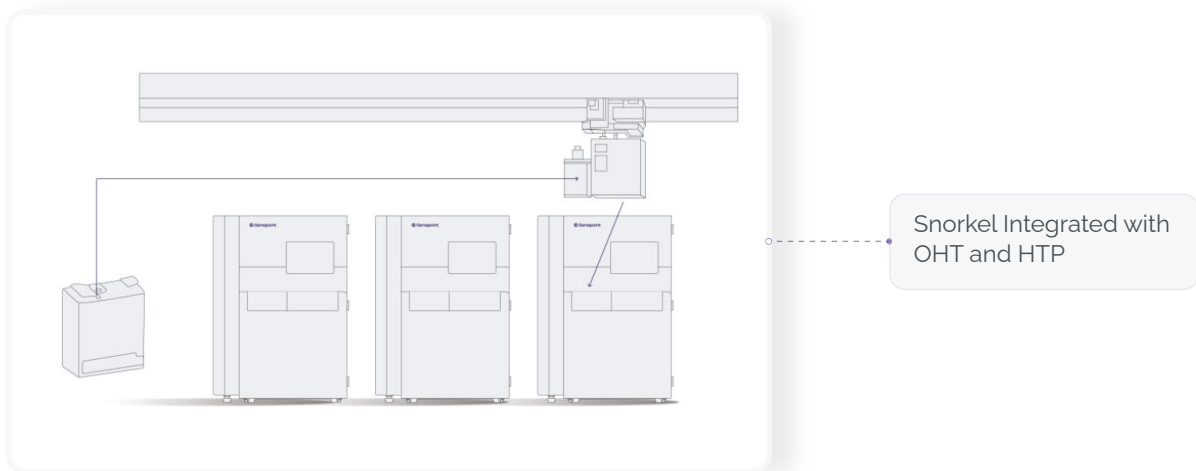
* Intelligent Reverse Tube-Picking: When the system detects that the number of tubes to be picked from the rack exceeds the available unused tubes, it will automatically transfer the unused tubes to empty racks and update the empty rack information in the database, thereby reducing the tube picking time.



Multi-Snorkel Collaboration

In high-throughput sample management scenarios, SampleAtlas greatly reduces the time required to locate samples, enabling a single operator to manage more than five Snorkel simultaneously. The reserved retrieval function* enables near-instant access for users, eliminating operational waiting time entirely.

Multiple Snorkel devices can be networked together to form a cluster, allowing for unified management and scheduling of equipment. Additionally, Snorkel can be integrated with the Overhead Hoist Transfer (OHT) system and High-Throughput Passage (HTP) to enable fully automated, low-temperature transfer of samples throughout both inbound and outbound processes.



Users only need to operate fixed delivery equipment to control all devices within biobanks. By integrating clustering and automation, SampleAtlas effectively frees users' hands, significantly improves work efficiency, and enables automated, intelligent laboratory management.

* Reserved Retrieval Function: This feature is applicable only to tube-based models, specifically the Snorkel Pro and Snorkel Pro Max.



Seamless Integration to BIMS and LIMS

SampleAtlas provides standardized open API interfaces that seamlessly integrate with leading international BIMS (Biobank Information Management System) and LIMS platforms, enabling deep connectivity with laboratories' existing information systems.

The interface supports bidirectional data exchange: it receives commands from the host computer while simultaneously transmitting equipment status and sample operation data in real time, enabling centralized management and remote control of all Snorkel units.

- 1 One-Click Order & Task Allocation:** Initiate sample retrieval, inventory, or transfer tasks directly within BIMS/LIMS. With a single click, instructions are sent to Snorkel, eliminating manual re-entry, reducing errors, and saving time.
- 2 Multi-Snorkel Collaborative Scheduling:** When multiple units are in operation, the host computer continuously monitors the storage, temperature, and task status of all devices in real time. It intelligently assigns samples to the most suitable device and location based on their type and requirements, thereby maximizing overall utilization.



Summary

SampleAtlas meets the essential needs of laboratory sample management through a comprehensive solution that includes safety protocols, consumable compatibility, customizable workflows, data integration, and precise sample preservation. This integrated approach enhances laboratory efficiency while ensuring sample quality and the reliability of subsequent experiments.

Laboratories and biobanks, in turn, can cut costs, boost efficiency, and speed up their digital and precision-driven transformation.

About Genepoint

Genepoint Technologies is committed to providing innovative, automated, intelligent, and comprehensive storage solutions for biological samples. We focus on independent research and development, ensuring full control over the entire R&D and production process.

Upholding the mission of "Inspire Life Exploration", Genepoint consistently pushes technological boundaries and advances the practical applications of life sciences and biomedicine through ongoing innovation.

Genepoint is headquartered in Shanghai and has production, R&D, and product operation centers in both China and Singapore.



Official Website



Linkedin

For more information, please visit www.genepoint.com or email us at info@genepoint.cn.

The product is only for industrial or scientific research purposes, not for medical use.

It must not be used directly or indirectly for clinical diagnosis or other unauthorized clinical medical purposes.