



# Fully Automated Genotyping Powered by Pneumatic Assay Storage and Transport

Engineering Team and Operations Team

## Key highlights:

- Transnetyx chose to transform its TaqMan assay storage and retrieval process, involving manual freezers and lab technicians, as it was labor-intensive, error-prone, and overall, an undesirable job experience.
- This automated workflow from SPT Labtech delivers robust  $-20^{\circ}\text{C}$  storage with comPOUND<sup>®</sup>, remote assay retrieval to the lab bench with the connect, and automatic tube return with comSTACKER 2.
- Automation with comPOUND<sup>®</sup> has increased throughput to 24-hour operations 6 days/week and enabled scalability to accommodate an annual company growth rate of 15-18%.
- The team has introduced a second comPOUND<sup>®</sup> unit to support future growth and further increase walkaway capability.



## Introduction to Transnetyx

Transnetyx was founded to introduce the first fully automated genotyping system for detecting transgenic, knockout, knock-in, single nucleotide polymorphism (SNP) and CRISPR mutations in animal research models, primarily mice.

To date, they have genotyped more than 30 million samples, helping researchers to work as efficiently as possible by providing accurate results guaranteed within 72 hours.

Examples of their services include the ability to determine which animals have successfully picked up a specific mutation for research purposes, and determining if animals are pure-bred through Genetic Monitoring services. They also provide microbiome analysis of gut bacteria to enable researchers to determine how animals might respond to treatments. For more information about Transnetyx and their full suite of services, please visit [Transnetyx.com](https://www.transnetyx.com).

## The limitations of manual assay management

The team stores thousands of precious and sensitive assays at any one time. They need to be able to accurately track assay tubes in their library and retrieve those tubes quickly to meet their high standards of speed and accuracy.

Initially, tubes were kept in four traditional manual freezers, and two full-time technicians were dedicated to retrieving assays for analysis. Over a 10-hour working day, two technicians would pull over 2000 tubes for analysis and would return the same number of tubes to the freezer. Not only was this process laborious and error-prone, but it also resulted in a less than desirable work experience due to the tedious and uncomfortable nature of the work. It was clear that this process was far from optimal and so the Transnetyx team looked for an automated solution.



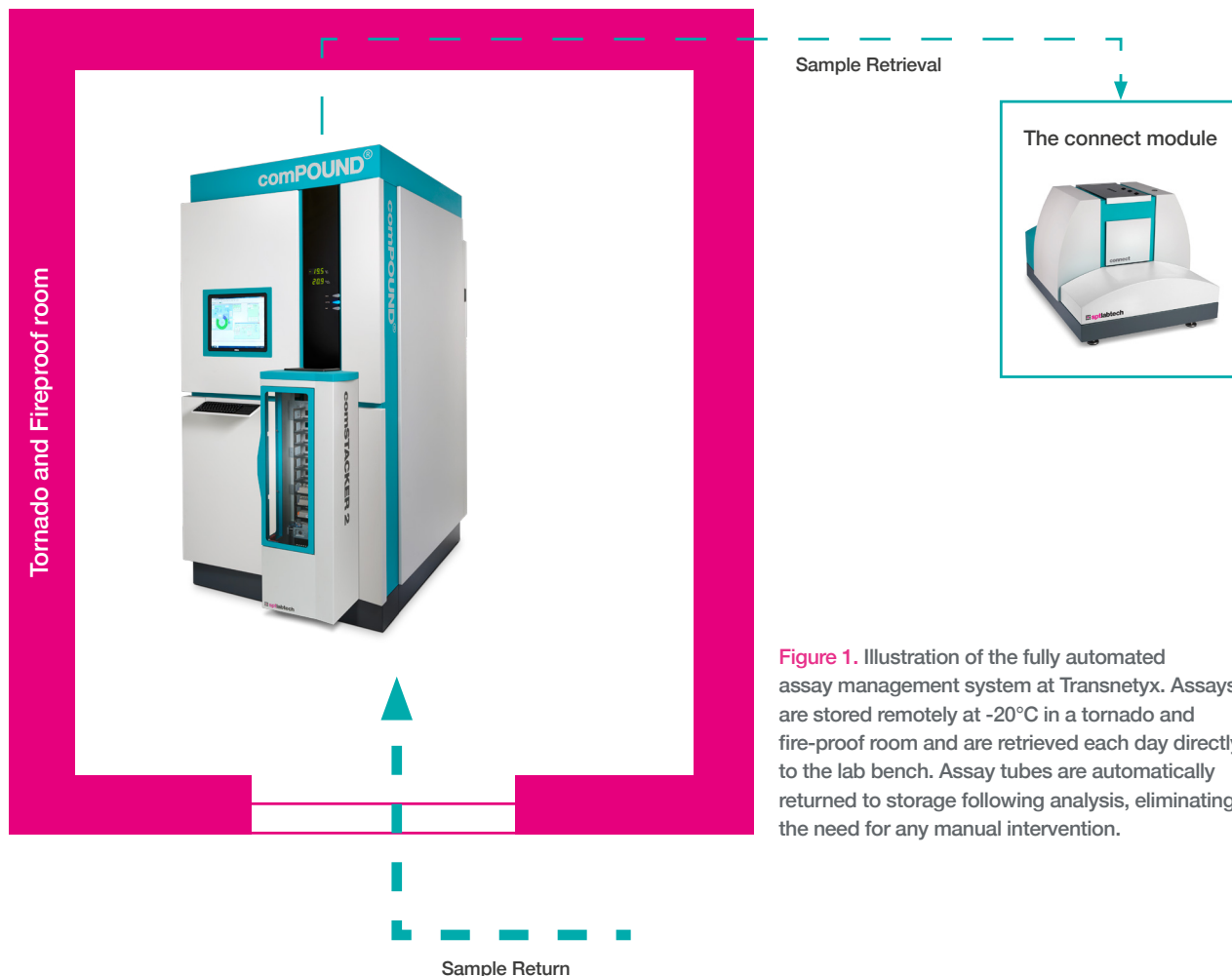
## Criteria for an automated solution

The team needed an automated solution that fulfilled the following criteria:

- **Reliability:** Any down time due to system failure risks costly assay loss and processing delays. As the team guarantees results turnaround in 72 hours, they run to an extremely tight schedule.
- **Compact footprint:** With laboratory footprint at a premium, the team wanted to be able to maximize their available space.
- **Speed:** To support the high throughput demand, the team required a system that increased the speed of handling assays at scale.
- **Ease of access:** Required assay tubes must be readily accessible at the start of every day to prevent any bottlenecks to productivity.
- **Remote storage:** Assays are stored in a separate tornado and fire-proof room to ensure their safety. An ideal solution needed to provide automated retrieval from this room to the lab, to maximize efficiency and redundancy.

# The SPT Labtech automated workflow

Transnetyx chose to implement an automated assay management workflow from SPT Labtech that fulfilled their criteria. This is illustrated in Figure 1.

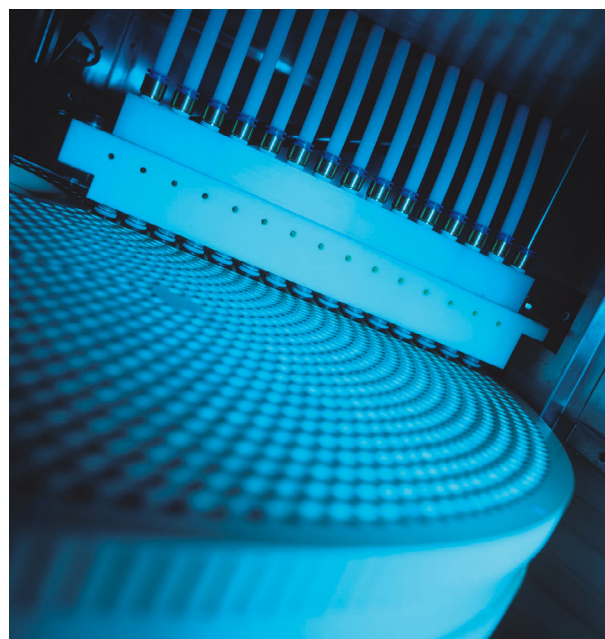


**Figure 1.** Illustration of the fully automated assay management system at Transnetyx. Assays are stored remotely at -20°C in a tornado and fire-proof room and are retrieved each day directly to the lab bench. Assay tubes are automatically returned to storage following analysis, eliminating the need for any manual intervention.

2D barcoded assay tubes are stored in the tornado and fire-proof room in comPOUND®, a secure -20°C automated freezer. Its rack-less technology and innovative carousel design delivers high density storage within a small footprint and allows for rapid retrieval of cherry-picked tubes, transporting tubes through using robust pneumatic technology.

This same pneumatic technology is utilized by the connect module, to transport cherry-picked tubes directly to the lab bench, replacing the need for technicians to travel between the two rooms. This is denoted by the teal dashed line in Figure 1.

Transnetyx opted to expand the performance of their comPOUND® with comSTACKER 2, which enables the team to automatically return tubes to the freezer as required throughout the day. The resulting workflow is a fully walkaway operation, freeing up technician time and maximizing operational efficiency.



comPOUND® features a unique carousel design that provides high density rack-less tube storage. Cherry-picked assays are retrieved through pneumatic tubes as selected, protecting all other assays from exposure to ambient temperature.

## What has this meant for Transnetyx?

Implementation of SPT Labtech's automated assay management workflow has transformed operations at Transnetyx, yielding numerous benefits:

- **Increased throughput by enabling 24h operations six days a week:** To scale this continuous operation was simply not feasible with the previous manual workflow. It is aided by the dedicated service and support provided by SPT Labtech's reliance® engineers, including rapid remote troubleshooting.
- **Increased walkaway capacity:** By relieving the burden of manual tube handling, more time and resource can be dedicated to productive analysis work.
- **Improved employee retention:** Automation has taken the burden of tedious and uncomfortable assay handling tasks. This transition has freed technicians to engage in more varied and fulfilling roles, contributing to higher job satisfaction.
- **Enhanced risk management:** The ability to store assay tubes in a separate, secure room away from the main lab has significantly enhanced risk management. The automated system facilitates the safe storage and direct transport of assays when needed, ensuring the integrity and safety of precious materials.
- **Improved inventory management:** The system allows for comprehensive inventory management through unique 2D barcoded vials. This ensures efficient tracking and retrieval, highlighting assays that haven't been accessed for long periods and optimizing assay tube utilization.
- **Scalability:** The enhanced efficiency and reliability of the automated system have enabled Transnetyx to scale its operations effectively, supporting an annual growth rate of 15-18%. The system's capacity to handle increased sample volumes seamlessly has been pivotal in accommodating the company's expansion.



## Future outlook

The team has chosen to expand its current system by introducing a second comPOUND® equipped with comSTACKER 2 into the workflow. Not only will this support future growth, but it will replace the current manual freezer which serves as a back-up, to further improve walkaway capabilities. A fully redundant system will protect against disaster and mitigate any costly downtime from unexpected maintenance.