



# Stratys™ v2.0 Release Notes

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A

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# Table of Contents

|                                         |           |
|-----------------------------------------|-----------|
| <b>Revision History</b>                 | <b>3</b>  |
| <b>Overview</b>                         | <b>4</b>  |
| <b>Introduction</b>                     | <b>4</b>  |
| Features                                | 4         |
| <b>References</b>                       | <b>4</b>  |
| <b>Compatibility</b>                    | <b>5</b>  |
| <b>Stratys ICS Feature Highlights</b>   | <b>5</b>  |
| Stratys Instrument Control and Workflow | 5         |
| Enhanced Security Measures              | 5         |
| Service and Manufacturing               | 6         |
| Version 2.0 Highlights                  | 6         |
| V2.0 Select Feature Details             | 6         |
| Feature and Improvements Summary        | 7         |
| Fixed Defects                           | 7         |
| Known Issues                            | 8         |
| <b>Technical Assistance</b>             | <b>9</b>  |
| <b>Legal Notice</b>                     | <b>10</b> |
| Patents                                 | 10        |
| Trademarks                              | 10        |

## Revision History

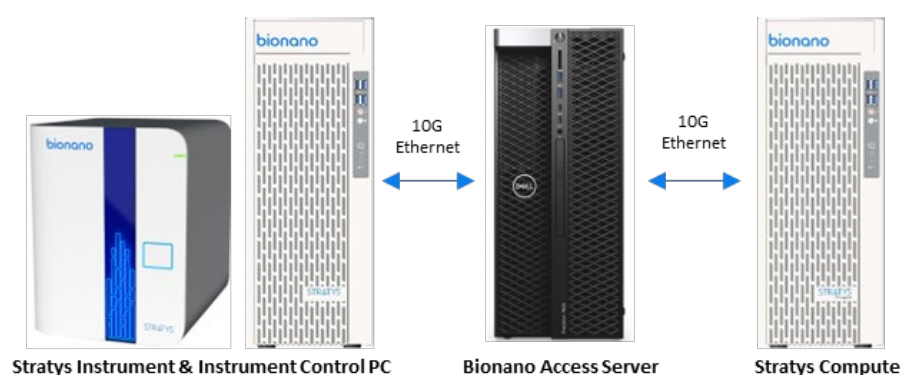
| REVISION | NOTES            | Author        |
|----------|------------------|---------------|
| A        | Initial release. | C. Schoonover |

## Overview

This document captures the release notes for Stratys™ ICS (Instrument Control Software). In this document, we will provide an overview of software features, compatible hardware, software, and known issues. Should you have any questions, please contact [support@bionano.com](mailto:support@bionano.com).

## Introduction

The Stratys System (Stratys Instrument with Instrument Controller, Bionano Access™ Server and Stratys Compute Server) provides rapid, high-throughput optical genome mapping for sensitive and accurate detection of genome-wide structural variation and an integrated software solution for the visualization, interpretation, and reporting of results with VIA software.



## Features

- **Intuitive loading workflow:** The adaptive loading feature in the Instrument Control Software (ICS) ensures that the optimal conditions for DNA molecule loading are maintained throughout the scanning process. The initial hands-on-time is approximately five minutes per sample.
- **Convenient and easy setup:** Bionano Access allows users to set up chip runs, track and review run metrics, perform downstream analysis, and export and share data.
- **Real-time analysis:** Bionano Access enables users to view real-time data and performance metrics from any internet browser with connection to the Access Server as the run progresses.
- **Bionano Assure:** Optional instrument health monitoring service that continuously inspects data quality and instrument performance. Additionally, this provides a streamlined diagnostic workflow for customers to interact with Bionano Support.

Stratys ICS v2.0 supports the Stratys instrument and is compatible with Stratys Instruments (P/N 60534).

## References

- Stratys v1.0 Release Note RNOTE-00015

## Compatibility

Stratys ICS v2.0 is compatible with Bionano Access v1.8.1.1 and higher.

## Stratys ICS Feature Highlights

### Stratys Instrument Control and Workflow



Stratys Instrument & Instrument Control PC

This document marks the incremental release of the Stratys Instrument Control software supporting the Stratys instrument and Stratys consumables. The software controls all aspects of the hardware and workflow including motion control, configuration, sample imaging, molecule detection, and quality metrics generation. Features include:

- Safe and coordinated multi-chip hardware control for the shuttle, carousel, and XY Stage
- Performance optimized operation of the instrument for DNA loading, acquisition, and cleaning
- User friendly and convenient batch loading and configuration workflow
- Real time monitoring and analysis from the connection to Bionano Access
- Integrated Molecule Quality Report (MQR) generated in parallel with sample acquisition
- Integrates with Stratys Compute for high performance, local alignment

### Enhanced Security Measures

Stratys ICS software and the operating system implement best practices for safe and secure operation. These features include:

- The ICS application operates in kiosk mode which restricts interactions with the OS. Stratys ICS includes most, if not all, system operations needed to service and administer the system.
- Controlled access to operating system accounts with administrative permission. This further restricts users from making potentially damaging changes to OS settings, drivers, or installing non-verified software. Customers that require administrative privileges can request access to a Stratys IT Admin user account.
- ICS manages Windows and software updates through Bionano Assure including forcing critical updates after a set period, without interrupting instrument runs.

- Windows OS configured following recommendations from penetrative assessment and testing.

## Service and Manufacturing

Stratys ICS includes the tools necessary to support manufacturing and infield servicing, including:

- Kiosk Accessible Tools - network configuration, image export, and resetting computer information
- Molecule Visualization for service and application support
- Integrated Workflow Diagnostic Tools
- Stratys is supported by the Bionano Assure portal - <https://assure.bionano.com/>
- Remote Monitoring and Support through TeamViewer and Assure
- Stratys instrument specific files are located on the instrument, allowing service and support to replace ICS workstations as needed without impacting configuration.

## Version 2.0 Highlights

- Bug Fixes and Software Performance Improvements
- Scan performance and throughput improvements including:
  - Deterministic scheduler – all samples experience the same loading time without impacting time-to-sample.
  - Continuous focus servo control improves scanning time
  - Motion optimizations for chip transfer minimizes stage movement time
- Expanded DNA sample support
  - Support for new DNA recipes with lip concentration customization
  - Increased DNA re-optimization frequency
  - Adaptive laser pillar cleaning for "cloggy" samples
- Robustness Improvements that support longer instrument uptime
  - Additional hardware retry and recovery
  - Motion optimization for chip transfer
  - Camera recovery and control updates
- Update Service Tools and Logging
  - Revamped service tools and improved logging outputs to improve instrument serviceability.
  - Integrated Diagnostic Viewer to review run data in Kiosk Mode with stopping chip runs in progress

## V2.0 Select Feature Details

### DNA LOADING RECIPE WITH LIP CONCENTRATION AND INCREASED DNA RE-OPTIMIZATION FREQUENCY

- ICS v2.0 adds a second lip concentration step in the DNA loading recipe, plus an extra loading re-optimization on Scan 7. Along with Adaptive Laser Cleaning, these updates help sustain and improve sample throughput.

## NEW LASER PILLAR CLEANING FOR "CLOGGY" SAMPLES

Stratys ICS v2.0 deploys with several strategies to minimize pillar clogging:

- Perform laser cleaning every scan in Hybrid Mode which alternates between full bank and selective adaptive pillar cleaning each scan.
- Inspect the pillars for clogging and adaptively increase exposure time based on clog score. ICS attempts to maintain a Clog Score below 600.
- "Turbo Mode" – 2x laser cleaning exposure increase during first 8 scans.

## Feature and Improvements Summary

| Area(s)     | Summary                                                                                           | Notes                                                                                                     |
|-------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Diagnostics | Integrated service tools into ICS with the need to exit KIOSK mode.                               | Reduces the required coordination to stop runs, reboot the PC.                                            |
| Workflow    | Improved DNA loading schedule, DNA Lip concentration, and re-optimization frequency.              | Improves throughput for difficult samples.                                                                |
| Workflow    | Adaptive Laser Cleaning for v2.0 Stratys                                                          | Includes several improvements to increase laser cleaning exposure time while preserving optimal scan time |
| Workflow    | Improved mechanical transfer operations to reduce failure, minimize motion and improve scan-time. | Recovery mechanism to reduce downtime                                                                     |
| Workflow    | Update Stratys to run .NET 8, Visual Code 2019                                                    | Software security and platform update                                                                     |
| Workflow    | High speed, servo focuser                                                                         | Enable a parallel focusing mode that reduces scan time                                                    |
| Workflow    | Illumination Baseline can start with bad images                                                   | ICS Rejects bad flatfields that could cause low molecule detection                                        |
| Workflow    | Implement high contrast chip alignment algorithm.                                                 | Reduces registration issues.                                                                              |
| Service     | Add more metadata to the diagnostic file name                                                     | Tier 1&2 updates.                                                                                         |
| Service     | Add access to Putty and WinSCP                                                                    | Applications installed on disk. Requires exiting Kiosk Mode.                                              |

## Fixed Defects

| Summary                                                                                             | Resolution  |
|-----------------------------------------------------------------------------------------------------|-------------|
| Tip / Tilt gradient application does not manage XY move errors properly on poor performing hardware | Obsolete/NA |
| "Bad" flat field calibration was not logged, and bad flat field baselines could be integrated       | Fixed       |

|                                                                                                                                                  |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Uninformative error message during chip cancelation, message updated.                                                                            | Fixed |
| Uninformative error message when activating Windows with no internet connection                                                                  | Fixed |
| Access security token expires forcing users to restart ICS                                                                                       | Fixed |
| Instrument error does not allow the user to exit out Kiosk mode                                                                                  | Fixed |
| Rare application crash from unhandled exception(s) during molecule detection.                                                                    | Fixed |
| Infrequent issue where camera capture fails with a trigger timeout. The error can occur during DNA loading or scanning and causes a system crash | Fixed |

## Known Issues

### WINDOWS OS UPDATE DELAY

Users that apply an OS update, security patches or ICS update and restarts the ICS controller may see a black screen with mouse cursor after boot. The ICS controller appears stalled or frozen for several minutes. Eventually, up to ~10 minutes, the system will respond and the ICS application will start.

### ABORT DURING CHIP EJECT

If Abort or Cancel is clicked during chip ejection without removing the chip, the Shuttle Tray will retract with the chip still inside. The chip cannot be removed until Stratys ICS is restarted.

When the instrument is restarted, the chip will return to an empty spot on the carousel. You can then remove the chip as usual through standard operation.

### DEFERRED BUG SUMMARY

| Summary                                                                          | Severity |
|----------------------------------------------------------------------------------|----------|
| ICS will retract the shuttle if Abort or Cancel click without removing the chip. | 4 - Low  |

## Technical Assistance

For technical assistance, contact Bionano Technical Support.

You can retrieve documentation on Bionano products, SDS's, certificates of analysis, frequently asked questions, and other related documents from the Support website or by request through e-mail and telephone.

| TYPE    | CONTACT                                                                                                                                                                                                                                                        |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Email   | <a href="mailto:support@bionano.com">support@bionano.com</a>                                                                                                                                                                                                   |
| Phone   | <p>Hours of Operation:<br/> Monday through Friday, 9:00 a.m. to 5:00 p.m., PST<br/> US: +1 (858) 888-7663</p> <p>Monday through Friday, 9:00 a.m. to 5:00 p.m., CET<br/> UK: +44 115 654 8660<br/> France: +33 5 37 10 00 77<br/> Belgium: +32 10 39 71 00</p> |
| Website | <a href="http://www.bionano.com/support">www.bionano.com/support</a>                                                                                                                                                                                           |
| Address | <p>Bionano, Inc.<br/> 9540 Towne Centre Drive, Suite 100<br/> San Diego, CA 92121</p>                                                                                                                                                                          |

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