Green Button Go™

Automation Software Improves Speed and Accuracy of Cell Line Production

Innovative lab software automates scheduling, hit-picking and liquid transfer to boost walk away time
By Darren Arney, Field Applications Scientist, Biosero

High-throughput screening is a mainstay for cell line generation. However, the complex instruments used for high-throughput methods have many moving parts, and automation is essential to streamline and accelerate the process. By minimizing human intervention, sophisticated software can simplify workflows, decrease errors and free up laboratory staff for other tasks.

Still, early efforts to automate this process have often fallen short. Scientists have to circle back frequently to handle plates, reprogram software and ensure the process is running smoothly. Once the instruments have identified potential hits, users must again step in, transferring these promising wells to lower-density plates for further growth.

This persistent need for human intervention can put entire runs at risk. If users select the wrong transfer map, sending potential hits to an incorrect destination plate, the run may have to be scrapped, and the team has to start over.

Green Button Go™ Automation Scheduling Software, from Biosero, is a good example of a new class of automation technology that gives users full control over scheduling and imaging. The software automatically collects confluence data and analyzes those values, hit-picking and seamlessly transferring those hits to the next instrument.

Ease of Use Drives Efficiency

Green Button Go software has several features to help biotech researchers apply automation to high-throughput screening. The first is an easy-to-use interface. Operators can work from a single screen to start a run (See Figure 1). From there, they may not have to intervene until it's time to collect results.

Operators can readily schedule imaging days for multiple groups, assign group IDs, set start times, indicate quantities for source and destination plates, select storage incubators and provide confluence thresholds to identify hits. The software also gives researchers the ability to push imaging data to the company network for safekeeping and analysis.

Researchers can select which days they want to run an image and specify text strings to link plates together. Multiple users can also use the software to order the transfer of plates from the incubator to the imager at specified times or simultaneously. Using different group IDs and cell lines, they can ensure these expensive systems operate at their highest efficiency.

Because it's device-agnostic, the software integrates with any screening instrument, as well as other lab information management software (LIMS).

Automatic Hit Transferring

After sample imaging has completed the software compares the confluence goal assigned by lab operators during the initial setup with the imaging results (Figure 2). Based on this analysis, it selects the most successful cells and transfers them from 384-well to 96-well plates, giving them more room to grow as well as reducing the number of days to analyze, expediting processing.

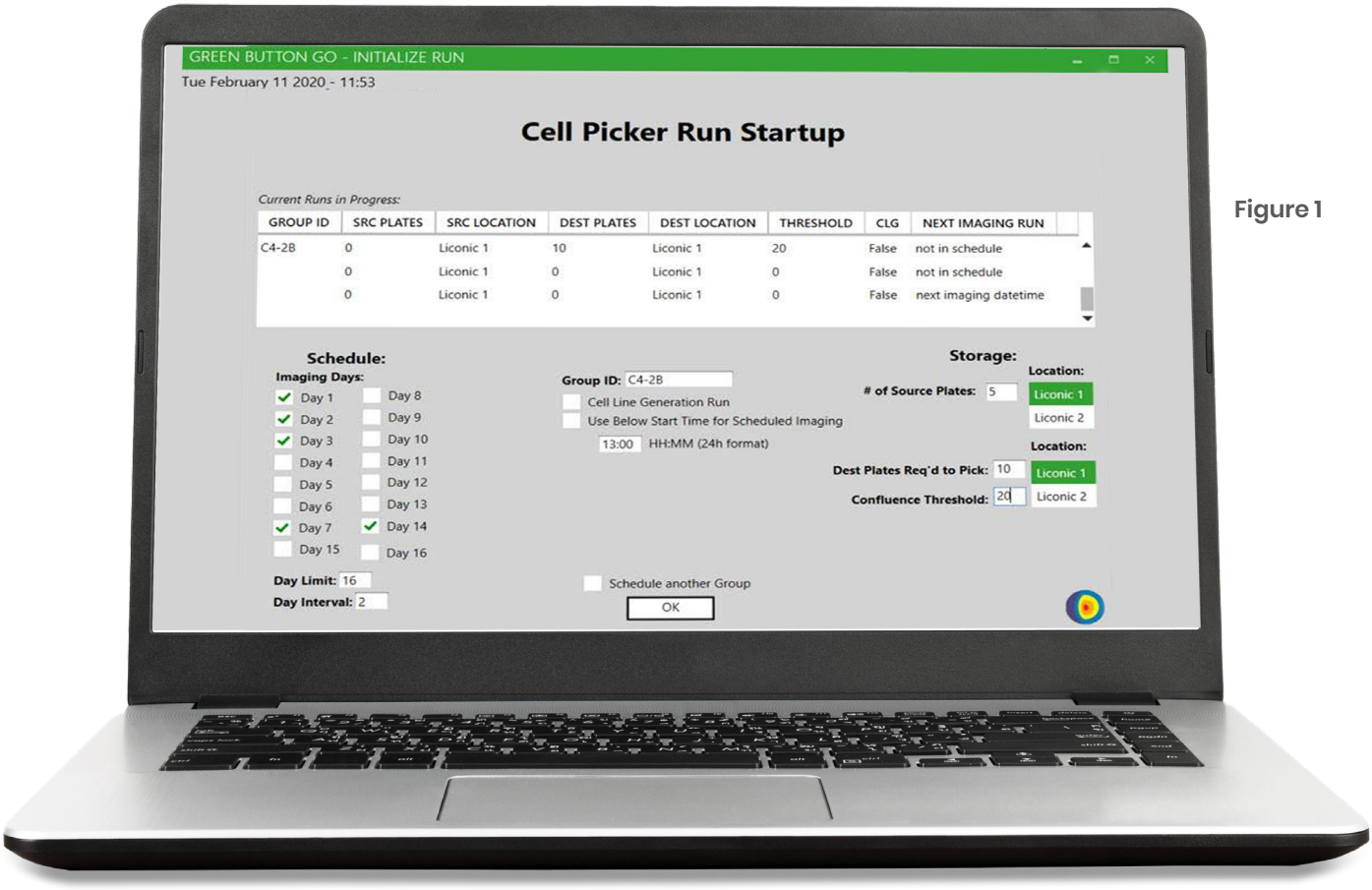

Figure 1

To schedule a demonstration of Green Button Go software, call (858) 880-7376 or email info@biosero.com

Plate Barcode Number	Timestamp	Well #	Confluence Data
384CLR_001677	2/7/2020 9:57:42 AM	A1	1.077395
384CLR_001677	2/7/2020 9:57:42 AM	A2	**34.930463**
384CLR_001677	2/7/2020 9:57:42 AM	A3	2.576411
384CLR_001677	2/7/2020 9:57:42 AM	A4	**35.236536**
384CLR_001677	2/7/2020 9:57:42 AM	A5	2.211128
384CLR_001677	2/7/2020 9:57:42 AM	A6	**33.131851**
384CLR_001677	2/7/2020 9:57:42 AM	A7	3.802107
384CLR_001677	2/7/2020 9:57:42 AM	A8	**46.048798**

Figure 2

After sample imaging is completed the software compares the confluence goal assigned during the initial setup so that successful cells can be transferred with hit-picking.

The image evaluation feature identifies wells that exceed the confluence threshold and adds them to a transfer list, generating an imaging report file (Figure 3) and assessing how many destination plates are needed. The report data includes barcodes, timestamps, well locations and the confluence value for each well on the source plate.

In addition to automatically evaluating whether there are enough hit candidates to fill the required destination plates, the software gives higher priority to the source plates with the most hits, automatically processing them first.

The software creates a list of candidates and converts that into a transfer map for the liquid handler, which applies the map automatically. As a result, users don't need to worry about selecting the wrong maps and possibly dispensing samples in an incorrect destination plate.

Also, Green Button Go software keeps close track of source and destination plates. If the liquid handler can only hold two destination plates – but needs five – the software schedules additional runs to fill the necessary destination plates. It can also assess whether a source plate has already been processed while the destination plate still has empty wells, allowing it to take cells from a different plate. Throughout the process, data is driving decision-making.

Figure 3

At the end of each scheduled imaging run, Green Button Go software uses plate reports from the imager and automatically compares them to the Day 0 parameters set up by the user. The software:

1. Identifies the total number of samples above assay threshold for hit-picking
2. Evaluates whether enough hits have been totaled to initiate hit-picking methods

If the run is qualified to initialize hit-picking the software will automatically:

1. Prioritize plates with the highest outgrowth to be picked first
2. Generate liquid handler transfer maps and worklist for hit-picking from 384-well to 96-well plates

Data Security

Many labs must keep pristine digital records to maintain 21 CFR part 11 compliance. Green Button Go software is available in a version that is 21 CFR part 11 compliant. Its features to enhance data security and closely track the chain of custody simplify audits.

Well-designed software can automate cell line generation, from scheduling all the way through imaging, data analysis and cell picking freeing up researchers to plan and analyze valuable experiments.

The software allows administrators to set user permission levels, as well as control password rules and expiration. It also records log files and timestamps each login (or attempt).

The Fruits of Automation

The mechanics of cell line generation are complex, but they don't have to be all-consuming. Well-designed software can automate the process from scheduling all the way through imaging, data analysis and cell picking freeing up researchers to plan and analyze valuable experiments.

Providing additional walk away time boosts efficiency. Lab technicians spend less time parenting the cell-picking machinery and can confidently perform other tasks while the software takes on the rote processes. The reduced human intervention also lessens the risk of mistakes.

Together, these refinements improve the efficiency and quality of work-life in the lab, make the cell line generation process run more smoothly and produce better results.

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