



LRIG Philadelphia Fall Exhibition:

Green Button Go: Providing Novel Solutions for Automating Workflows

26 Sept, 2017



No Engineering Required...

Added Features that Scientists can use
without Requiring Engineering Support

No Programming Required...

Green Button Go 2017

Problems seen with Drivers

- There is a lack of standardization in instrument communications;
- Problems with access to hardware.
- **Solution:** Streamline driver development, powerful drivers.

Complicated User Interfaces

- Intimidating interfaces discourage a wide range of users;
- **Solution:** Drag and drop, visual interfaces.

Short comings in Error Handling

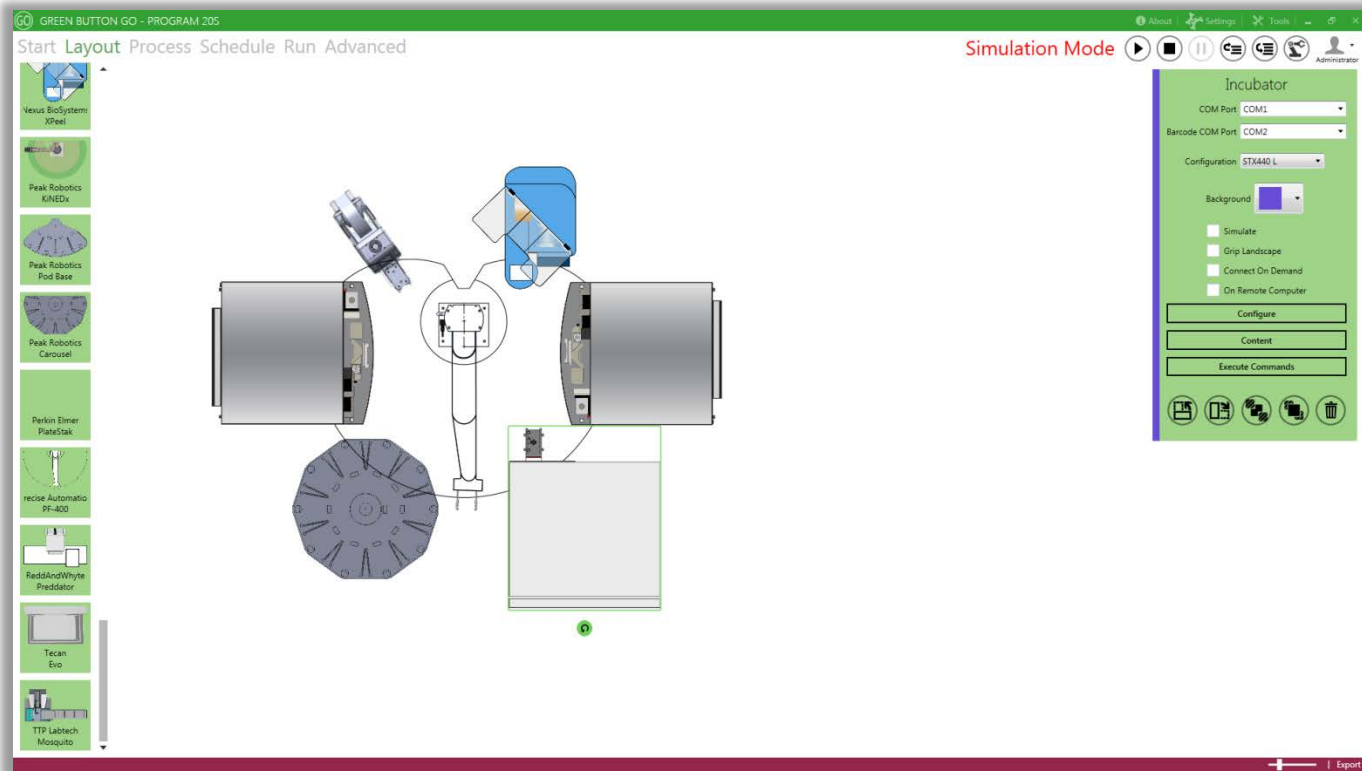
- **Solution:** Strong error handling, deadlock detection and prevention, developer mode.

- Easy to use
 - Drag/drop interface
 - Instrument, plate, and assay details displayed on single screen
 - Unified robotic teach pendant
- Flexible configuration
 - Easy to edit and reconfigure even while running
 - File processing tools and custom scripting available
 - Easy instrument pooling and offline equipment use
- Powerful error handling
 - Easily recover samples, precious reagents and data
 - Continue or modify the method
 - Intelligent deadlock handling
- Custom Driver Development
 - Willing to work with any instrument/manufacture
 - In-house software team able to rapidly develop new drivers



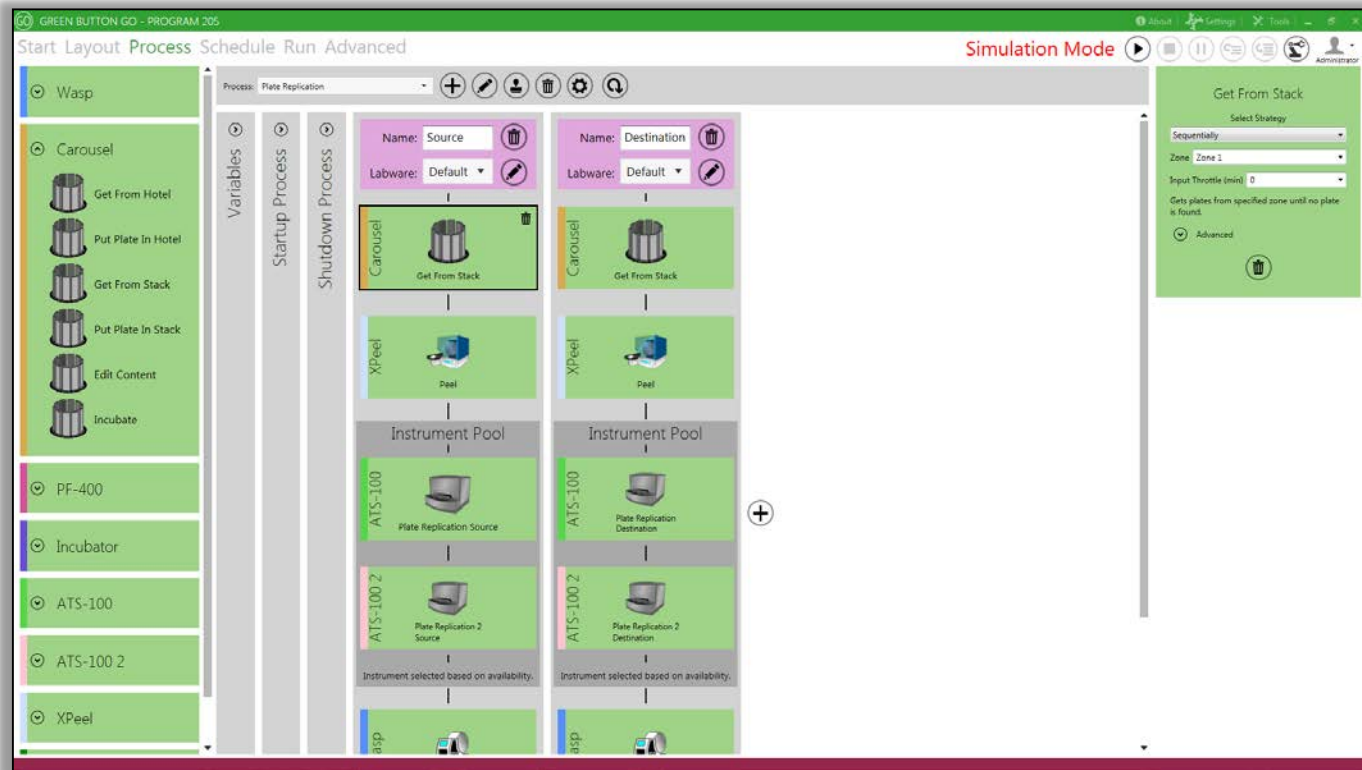
*Dynamic Scheduler
with Static Abilities*

Green Button Go Scheduling Software



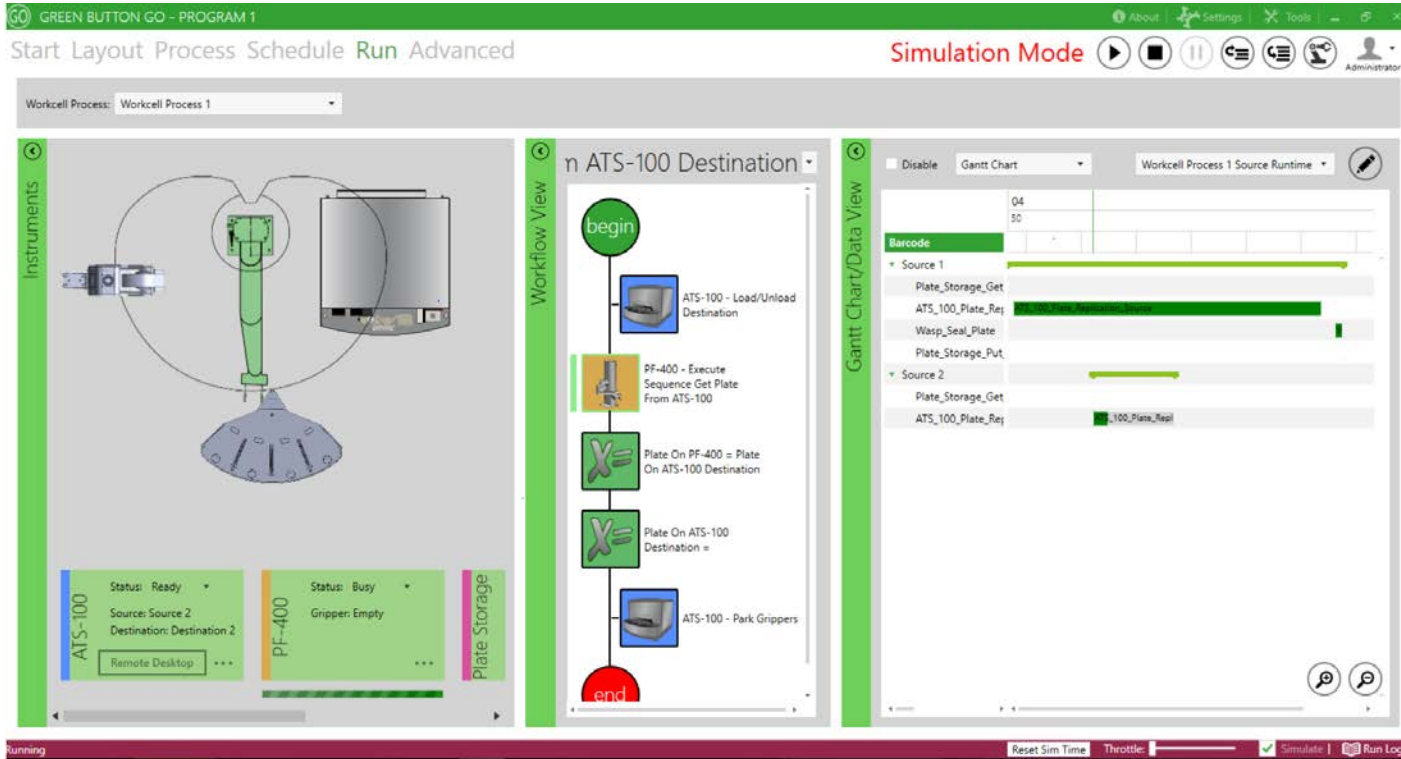
Drag and drop instruments to create a layout mirroring your actual physical setup.

Instrument Layout Designer



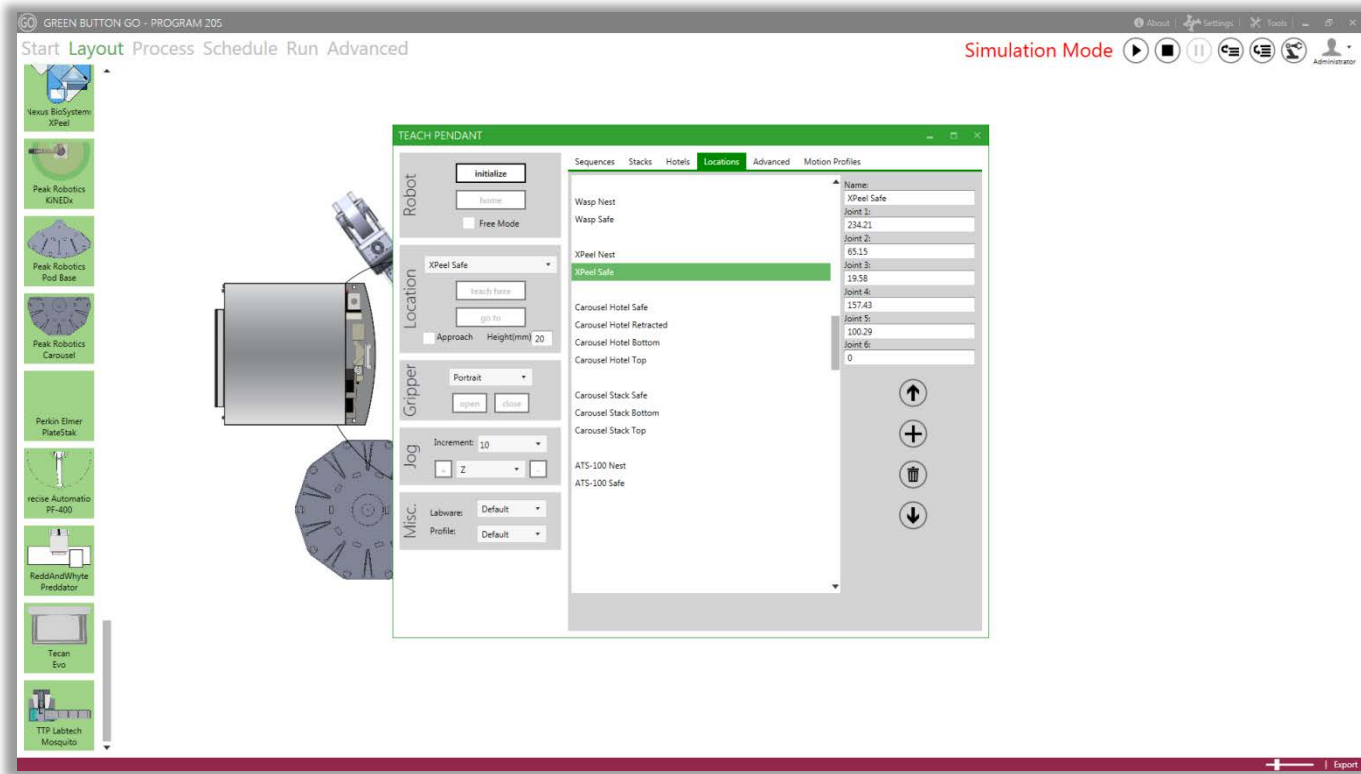
Assay protocols are easily created with our drag and drop designer. Process strategy selection allow you to define details.

Drag and Drop Process Designer



Instrument status, plate location, and process steps displayed on one screen

Run Information Display



Interface with all plate handling robots the same way

Unified Robotic Teach Pendant

GREEN BUTTON GO - PROGRAM 205

Start Layout Process Schedule Run Advanced

Simulation Mode

Workflow Commands

- Run Script
- Run Procedure
- Show Screen
- Conditional Branch
- Set Variable
- Loop
- Wait
- Message Box
- User Input
- Data File Loop
- Folder Loop
- Write To File
- Copy File
- Delete File
- Play Sound
- Send Email
- Launch Program
- Note
- Send Tweet
- End Loop
- Labware Info
- Run Scheduler
- Exit Procedure
- End Program
- Raise Error

Process Data

```

    graph TD
      begin((begin)) --> Folder[Folder = c:\run data,  
Variable = (Data Output File)]
      Folder --> File[File = (Data Output File)]
      File --> Write[Write To File: (User's Log File)]
      Write --> Copy[Copy File: (Data Output File) To Folder: c:\data archive\]
      Copy --> Delete[Delete File: (Data Output File)]
      Delete --> end((end))
  
```

Program Explorer

Settings

Variables

- Adhere Time = 2.5 Seconds
- ATS-100 2.Calibration = 95% DMSO InL
- ATS-100 2.DestinationPlate = 384 Nexus/Aurora P/N: 32611
- ATS-100 2.SourcePlate = 384 Nexus/Aurora P/N: 32611
- ATS-100 2.Status = Ready
- ATS-100.Calibration = 95% DMSO InL
- ATS-100.DestinationPlate = 384 Nexus/Aurora P/N: 32611
- ATS-100.SourcePlate = 384 Nexus/Aurora P/N: 32611
- ATS-100.Status = Ready
- BarcodeOfPlateInProcess =
- Carousel.Status = Ready
- Current Labware =
- CurrentPlateProcess =
- CurrentWorkcellProcess =
- Data Output File =**
- Incubator.Status = Ready
- Map File =
- Peel Location = Default - 2mm fast
- PF-400.Status = Ready

Properties

Advanced

File to Delete: (Data Output File)

Deletes the selected file.

Show Log Show Search

Simple file formatting and post process sample analysis using built in file processing tools or custom scripting

Data Management

Start Layout Process Schedule Run Advanced

Simulation Mode

The screenshot displays a simulation interface for a plate replication process. On the left, a sidebar lists process steps: Data Directed Transfers, Plate Replication, DRC with Intermediate, and Plate Storage (expanded to show Get From Hotel, Put In Hotel, Get From Stack, Put In Stack, Edit Content, Incubate, and Hold). The main workspace shows a process flow for 'Workcell Process 1' in 'Simulation Mode'. The flow starts with 'Plate Stor' (Get From Stack) leading to two 'Instrument Pool' blocks. The first pool, 'Instrument Pool 2', contains three source instruments: 'Plate Replication Source' (ATS-100), 'Plate Replication 4 Source' (ATS-100 3), and 'Plate Replication 2 Source' (ATS-100 2). The second pool, 'Instrument Pool', contains three destination instruments: 'Plate Replication Destination' (ATS-100), 'Plate Replication 4 Destination' (ATS-100 3), and 'Plate Replication 2 Destination' (ATS-100 2). A plus sign (+) is visible between the two instrument pools. The bottom status bar shows 'Opened Pooling' and a zoom slider.

The 'Instrument Pool' configuration panel is shown on the right. It includes a 'Select Strategy' dropdown menu currently set to 'None'. Below this, a note states 'Parameters can be changed on Source plate pool.' There is a radio button for 'Advanced' and a trash icon at the bottom.

Easy to pool multiple instruments with strategies including first available and even usage

Instrument Pooling

GREEN BUTTON GO - PROGRAM 205

Start Layout Process Schedule Run Advanced

Simulation Mode

Workcell Process: Plate Replication

Instruments

Workflow View

Put Plate On Wasp

begin

PF-400 - Execute Sequence Put Plate On Wasp

ERROR!

Error while executing program. Press 'Ignore' to ignore the error and continue on, 'Retry' to retry the command, and 'Stop' to end the run.

Wasp - Seal Sealer detached out of foil error. Please replace foil roll and press retry.

Click [here](#) to open Error Manager. View [Call Stack](#).

Ignore Retry Stop Modify

end

Gantt Chart/Data View

Plate Replication Source Runtime

Disable Gantt Chart

Barcode

Source 1

Carousel_Get_From_Stack

XPeel_Peel

ATS_100_Plate_Replicatio

Wasp_Seal_Plate

use_Put_Plate_In_St

Source 2

use_Get_From_Stack

l_Peel

100_2_Plate_Replicatio

p_Seal_Plate

use_Put_Plate_In_St

Source 3

use_Get_From_Stack

l_Peel

100_Plate_Replicatio

p_Seal_Plate

use_Put_Plate_In_St

Source 4

use_Get_From_Stack

XPeel_Peel

ATS_100_2_Plate_Replicatio

Wasp_Seal_Plate

Carousel_Put_Plate_In_St

Source 5

Carousel_Get_From_Stack

XPeel_Peel

ATS_100_Plate_Replicatio

Wasp_Seal_Plate

Carousel_Put_Plate_In_St

Wasp

Status: Error

Nest: Empty

Carousel

Status: Ready

Content

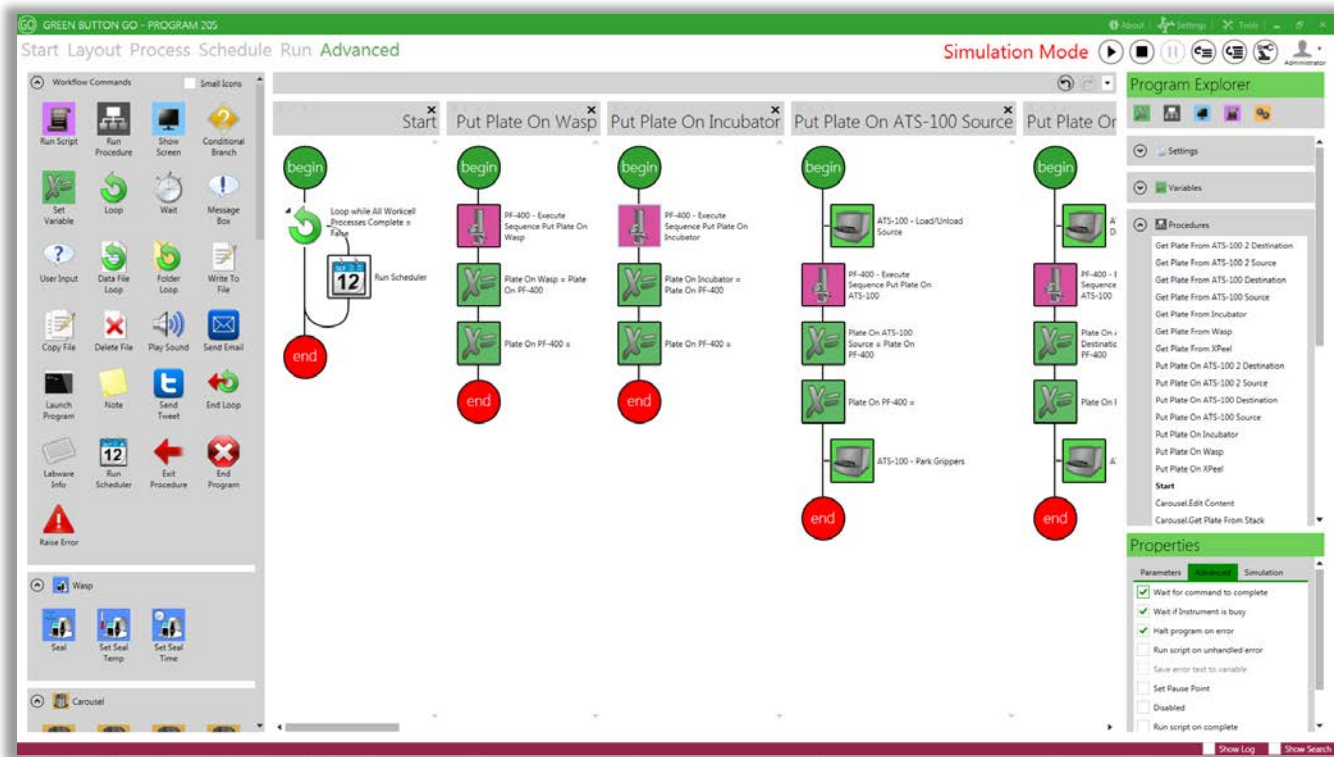
Throttle

Simulate

Run Log

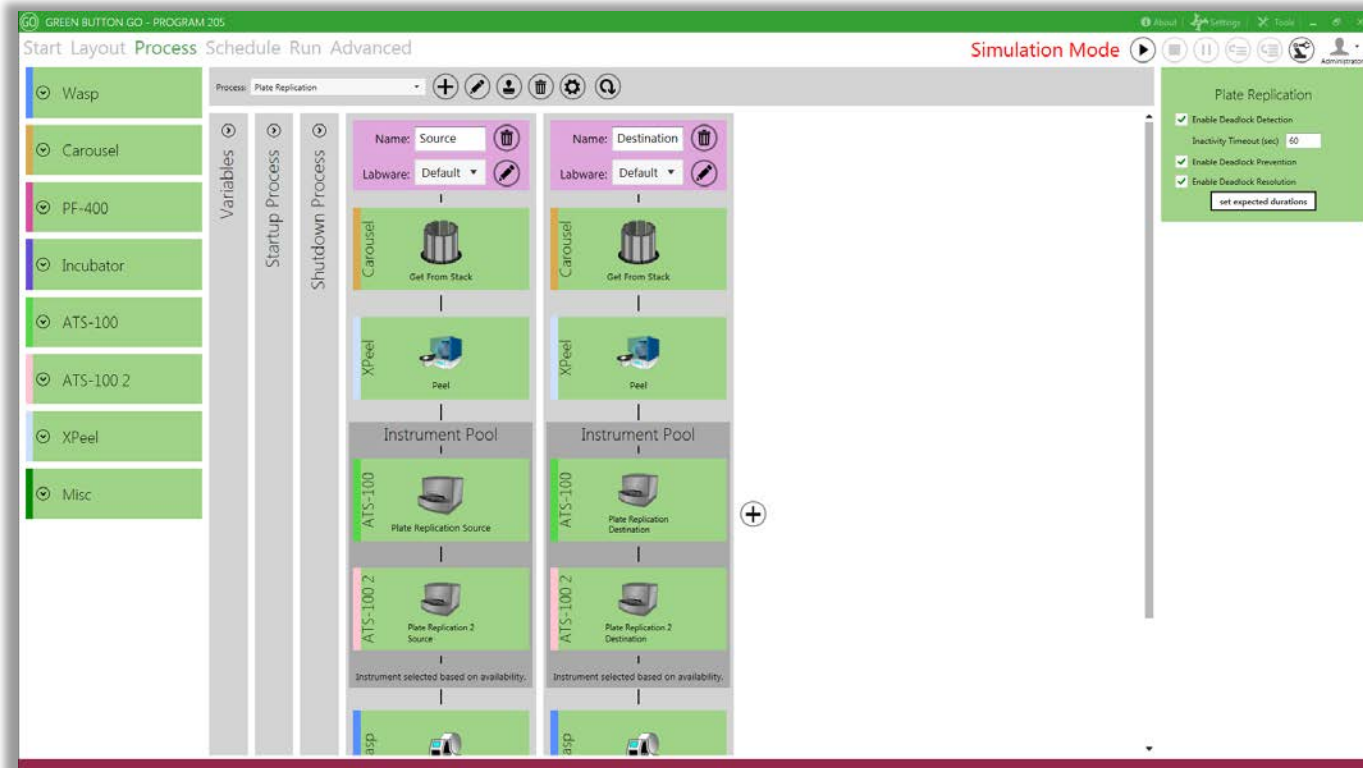
Operators can easily recover samples, precious reagents & data. Continue or modify the method even following a catastrophic instrument failure

Advanced Error Handling



Processes, workflows, screens, scripts and instruments can be edited and reconfigured even at runtime

Runtime Reconfiguration



Intelligent Deadlock
Handling:

Deadlock Avoidance
Deadlock Detection
Deadlock Resolution

Handle Deadlocks



Biosero will work with any manufacturer/instrument

We custom develop code for device integration rather than rely on factory drivers

Custom Driver Development

Thank You



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