

Put Your Smart GC to Work

Enable remote connectivity and take the guesswork out of GC Maintenance

George Reiner & Nicole Hart
Agilent Technologies, Inc.
Webinar
October 23, 2018



A User Interface Paradigm Shift is Taking Place

‘Touchtone phone to smartphone’



Understanding Key Success Factors

Listening to Users



What did we hear?

Customer Situation

Local lab expertise on hard to replace. Staff turnover increasing

Lab managers turning over, often with business specialists with less analytical expertise

Purchasing decisions becoming more business rather than technically driven



Transform the User Experience

- *Easier to install and setup*
- *Easier to use, troubleshoot and maintain*
- *Assist users to make less mistakes and be more productive*

A Better Business Outcome

- *Easier troubleshooting & maintenance*
- *Less/faster training; optimized HR & asset deployment*
- *Reduced unplanned downtime*

Mobile, Accessible Technology

Transforming the User Experience



New mobilized generation

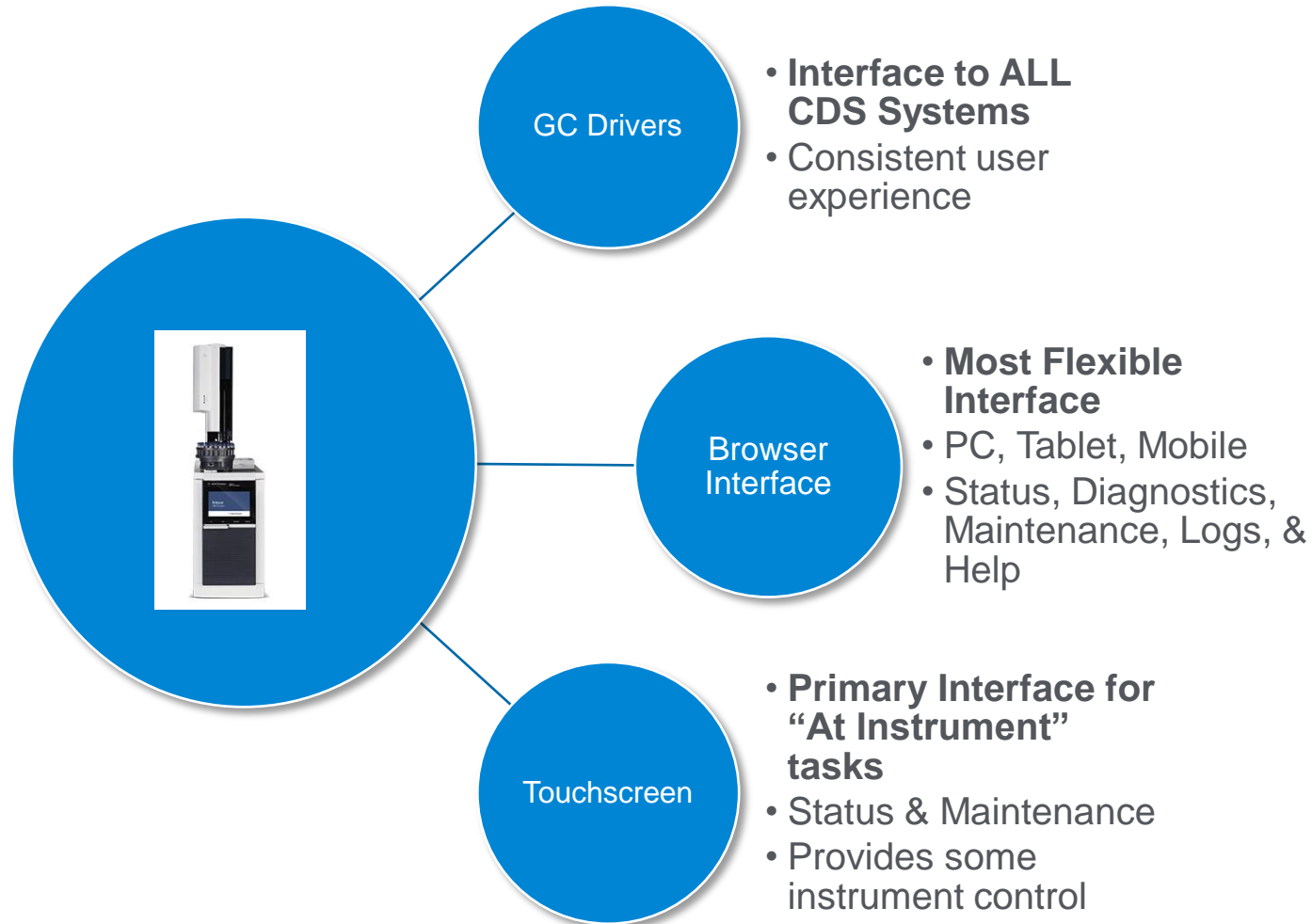
- Expectations of remote mobile connection
- Technology accessed through interactive graphic SW and apps

Make technology accessible

- Interface meeting today's expectations
- Online suite of customer support and information

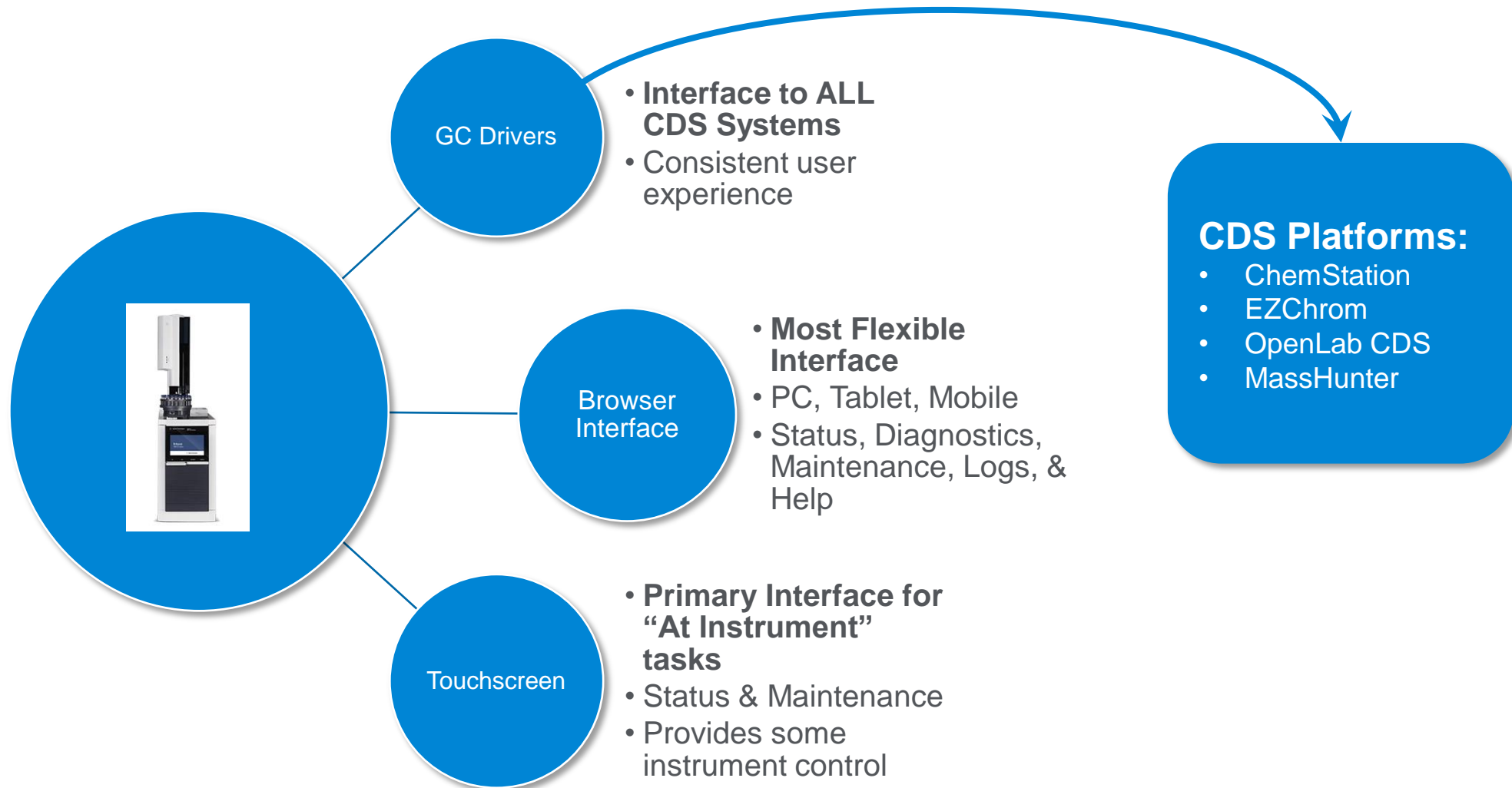
Every Interaction Matters

At instrument or remotely



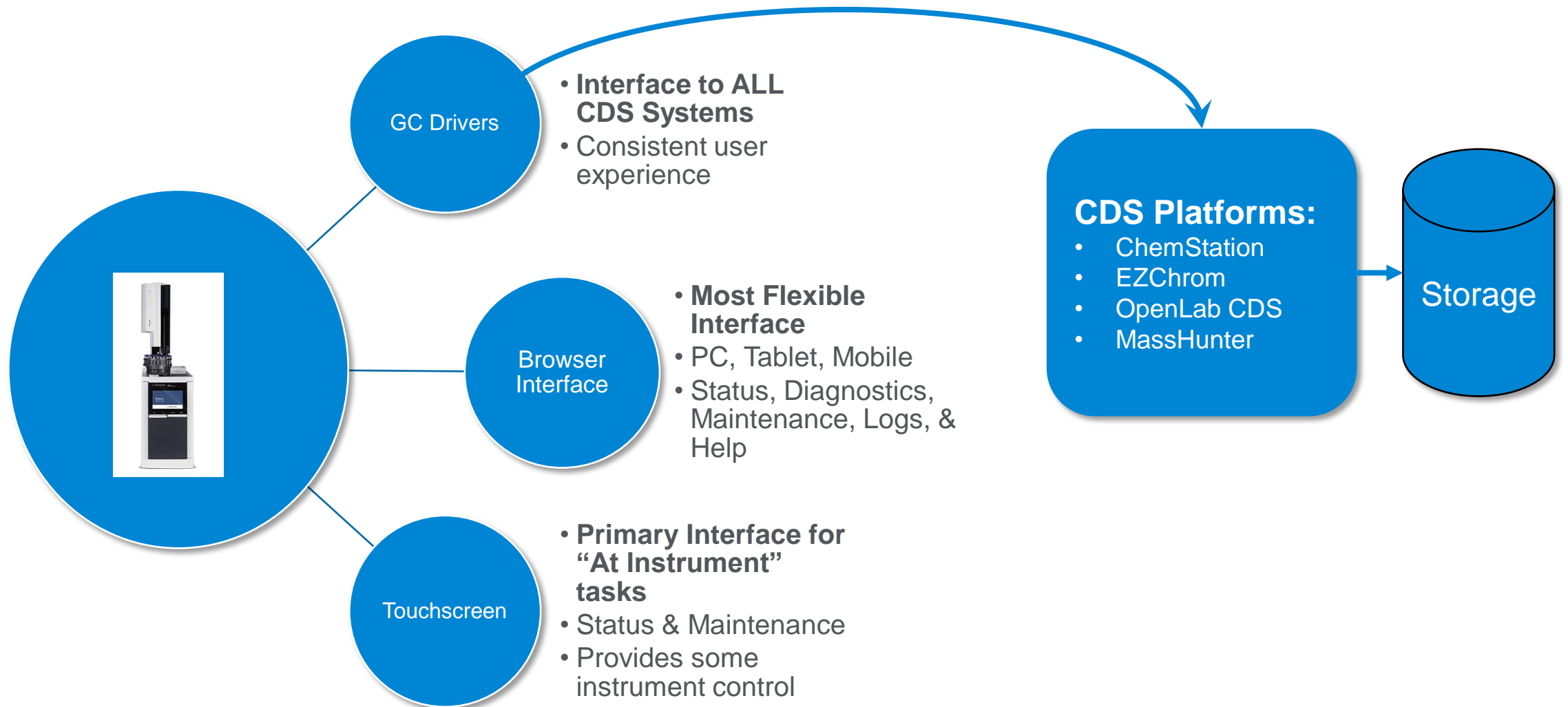
Every Interaction Matters

At instrument or remotely



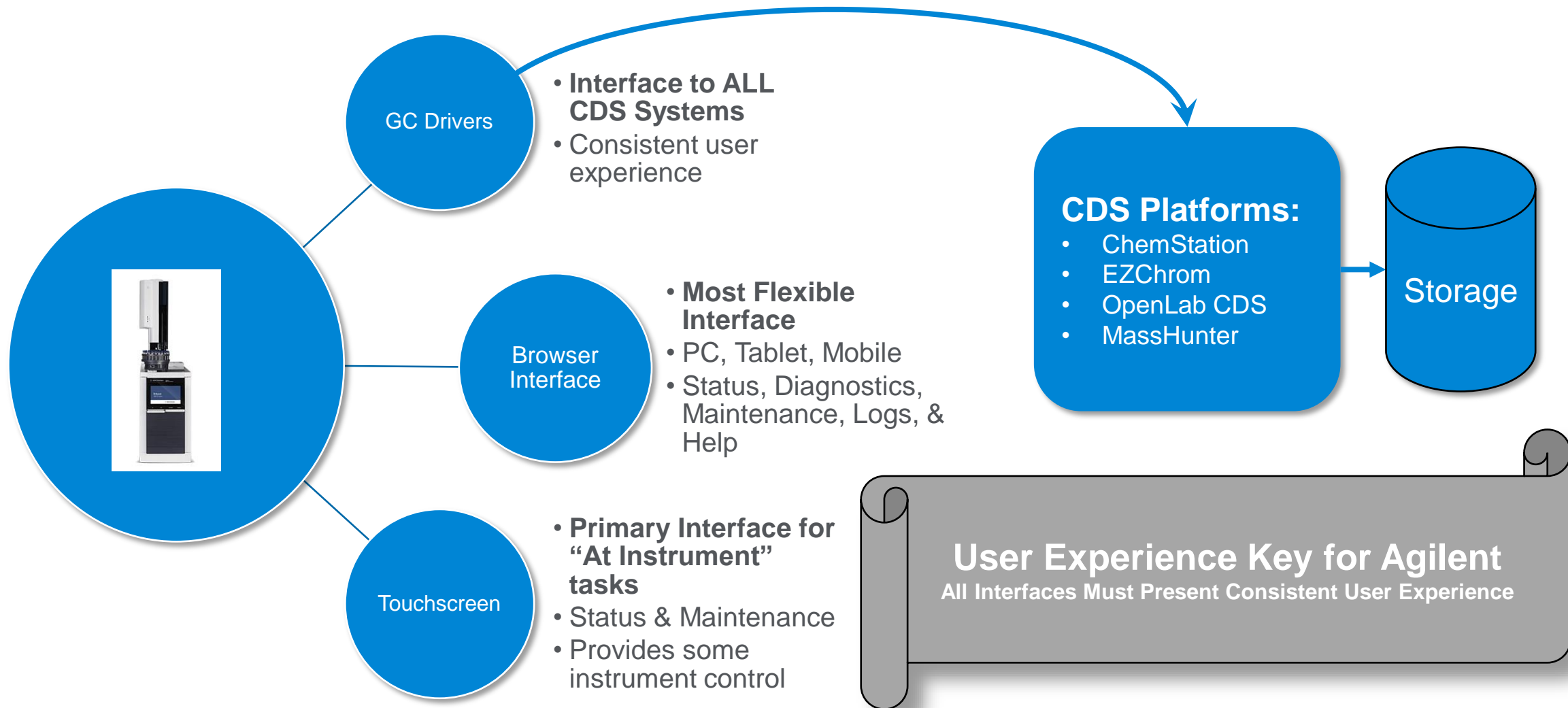
Every Interaction Matters

At instrument or remotely



Every Interaction Matters

At instrument or remotely



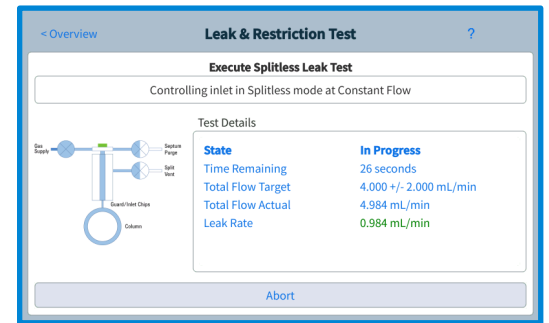
Key GC Intelligence and Software-Based Features

Built into the instrument firmware

Key GC Intelligence and Software-Based Features

Built into the instrument firmware

- Self-Aware Features
 - User Initiated Diagnostic Tests
 - Autonomous Diagnostic Tests
 - Autonomous Continuous Monitoring
 - Self Guided Diagnostic Troubleshooting
 - Traditional Early Maintenance Feedback (EMF) counters
 - Self Guided Maintenance Procedures



Key GC Intelligence and Software-Based Features

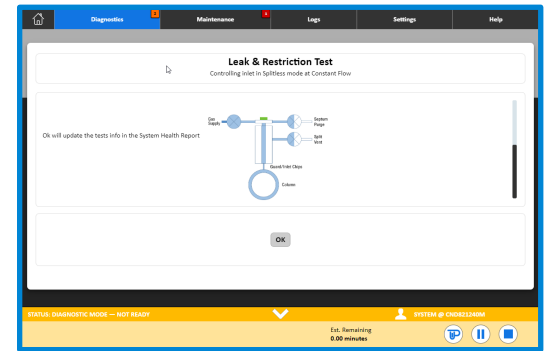
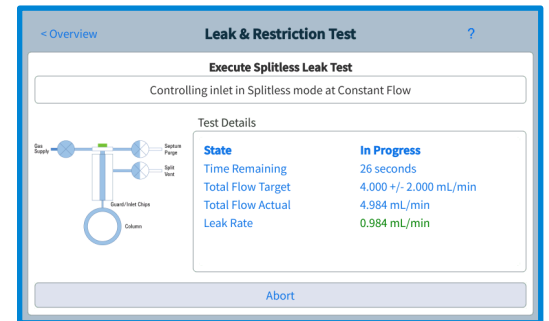
Built into the instrument firmware

- Self-Aware Features

- User Initiated Diagnostic Tests
- Autonomous Diagnostic Tests
- Autonomous Continuous Monitoring
- Self Guided Diagnostic Troubleshooting
- Traditional Early Maintenance Feedback (EMF) counters
- Self Guided Maintenance Procedures

- Browser Interface

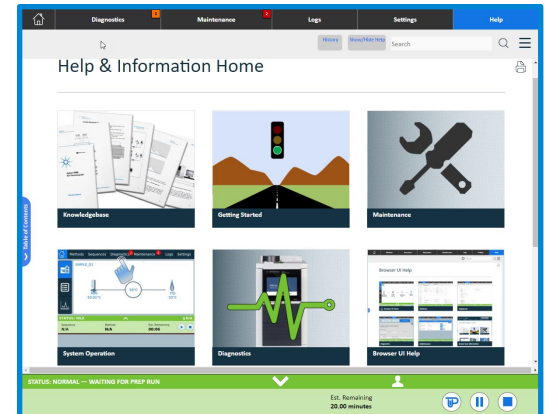
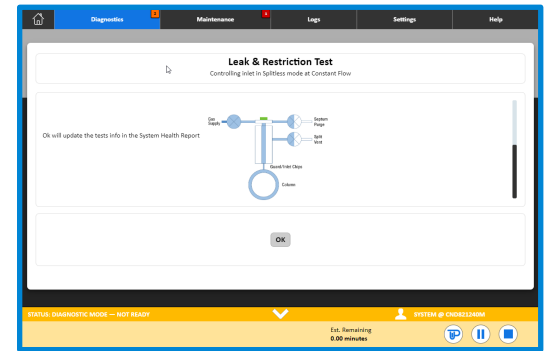
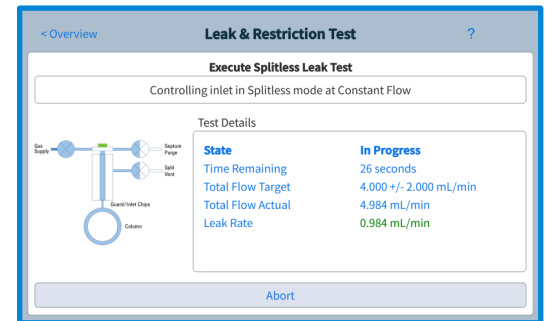
- Allows access to key features of your Smart GC from virtually anywhere



Key GC Intelligence and Software-Based Features

Built into the instrument firmware

- Self-Aware Features
 - User Initiated Diagnostic Tests
 - Autonomous Diagnostic Tests
 - Autonomous Continuous Monitoring
 - Self Guided Diagnostic Troubleshooting
 - Traditional Early Maintenance Feedback (EMF) counters
 - Self Guided Maintenance Procedures
- Browser Interface
 - Allows access to key features of your Smart GC from virtually anywhere
- On-Board Help & Information
 - Everything you need to be successful with your GC is right on the instrument



Self Aware GC Features

- **User Initiated Diagnostic Tests**
- Autonomous Diagnostic Tests
- Autonomous Continuous Monitoring
- Self Guided Diagnostic Troubleshooting
- Traditional Early Maintenance Feedback (EMF) counter
- Self Guided Maintenance Procedures

Manually started via touchscreen or browser interface

Inlets

Leak and Restriction Test
Pressure Decay Test
Tank Pressure Check
Split Vent Restriction Test
Septum Purge Flow Test

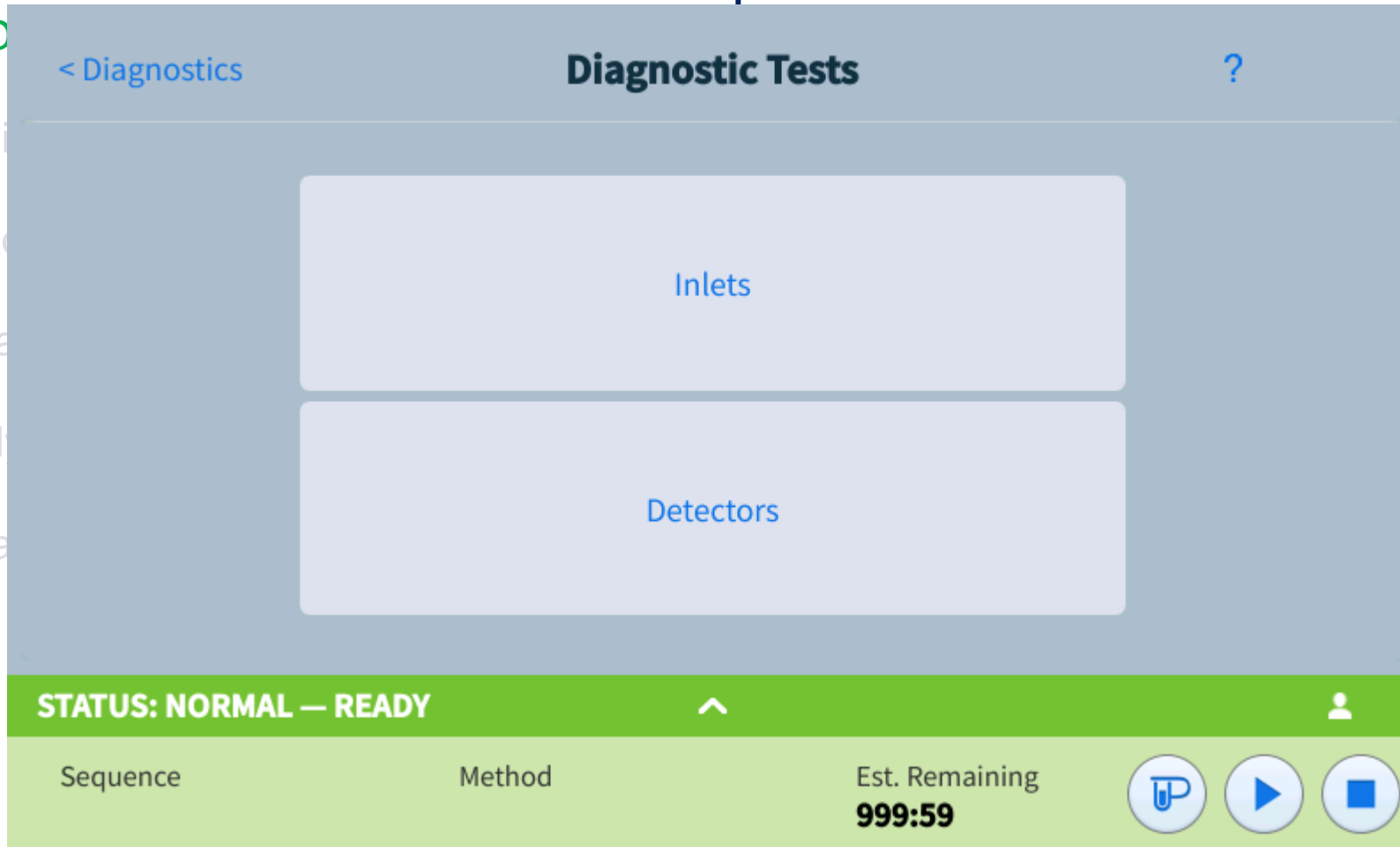
Detector – FID

FID Jet Restriction Test
FID Leakage Current Test

Self Aware GC Features

- User Initiated D
- Autonomous D
- Autonomous C
- Self Guided Dia
- Traditional Ear
- Self Guided Ma

Manually started via touchscreen or browser interface



Self Aware GC Features

- User Initiated D
- Autonomous D
- Autonomous C
- Self Guided Dia
- Traditional Ear
- Self Guided Ma

Manually started via touchscreen or browser interface

The screenshot displays a software interface for "Inlet Diagnostic Tests". At the top, there is a header bar with a back arrow, the text "< Diagnostic Tests", the title "Inlet Diagnostic Tests", a help icon "?", and a "Close" button. Below the header, a blue bar indicates the selected "Inlet 1". A scrollable list of diagnostic tests is shown, including "Leak & Restriction Test", "Pressure Decay Test", "Septum Purge Test", "Split Vent Restriction Test", and "Tank Pressure Check". At the bottom, a green status bar displays "STATUS: NORMAL — READY" with an upward arrow and a user icon. Below the status bar is a table with columns for "Sequence", "Method", and "Est. Remaining", showing a value of "999:59". To the right of the table are three circular icons: a flask with a 'P', a play button, and a square stop button.

Self Aware GC Features

Manually started via touchscreen or browser interface

- User Initiated Diagnostic
- Autonomous Diagnostic
- Autonomous Control
- Self Guided Diagnostic
- Traditional Early Warning
- Self Guided Maintenance

The screenshot shows a software interface for a 'Leak & Restriction Test'. At the top, there is a navigation bar with '< Overview' on the left and a question mark '?' on the right. The main title is 'Leak & Restriction Test'. Below the title is a section titled 'Diagnostic Test' with a description: 'Test to determine if there is a leak or restriction in the flow path.' Underneath is a 'Test Details' section. It contains a table with two columns: 'Testing' and 'Description'. The 'Testing' column lists 'Primary sample flow path (inlet, guard chip, flow chip, column)'. The 'Description' column contains a two-step procedure: '1. Verify the inlet can control to a pressure setpoint in splitless mode, validating the basic operation of the inlet and flow path.' and '2. Hold the pressure in splitless mode and monitor the flow error between actual and target column flow. If the actual is larger than the target, a leak exists in the flow path. If the actual is less than the target, a restriction exists in the flow path.' To the right of the description is a vertical scrollbar. At the bottom of the interface is a large button labeled 'Start Test'.

Self Aware GC Features

Manually started via touchscreen or browser interface

- User Initiated D
- Autonomous D
- Autonomous C
- Self Guided Di
- Traditional Ear
- Self Guided Ma

The screenshot displays the 'Leak & Restriction Test' interface. At the top, there is a navigation bar with '< Overview' on the left and a question mark '?' on the right. Below this is a header 'Leak & Restriction Test'. The main content area is titled 'Execute Splitless Leak Test' and contains a sub-header 'Controlling inlet in Splitless mode at Constant Flow'. To the left is a schematic diagram of the gas chromatography system, showing 'Gas Supply', 'Septum Purge', 'Split Vent', 'Guard/Inlet Chips', and 'Column'. To the right is a 'Test Details' box with the following information:

State	In Progress
Time Remaining	26 seconds
Total Flow Target	4.000 +/- 2.000 mL/min
Total Flow Actual	4.984 mL/min
Leak Rate	0.984 mL/min

At the bottom of the interface is a large button labeled 'Abort'.

Self Aware GC Features

- User Initiated Diagnostic Tests
- **Autonomous Diagnostic Tests**
- Autonomous Control
- Self Guided Diagnostics
- Traditional Early Maintenance
- Self Guided Maintenance

User configurable tests in method/sequence or instrument settings

Inlets

Pre Run Flow Test

While the ALS is preparing the sample, flip the inlet control into forward pressure mode (ie. Splitless) and verify the total flow against the calculated column flow.

Periodic Split Vent Restriction Test

While the instrument is idle (30 minutes of sequence inactivity), execute a split vent restriction test after every 100 runs.

Pre Sequence Tank Pressure Check

Parse the methods in the sequence and determine the maximum inlet pressure required to execute the sequence. Verify the inlet can achieve this pressure before beginning the sequence.

Self Aware GC Features

- User Initiated Diagnostics
- **Autonomous Diagnostics**
- Autonomous Control
- Self Guided Diagnostics
- Traditional Early Detection
- Self Guided Maintenance

Active Method ? Close Apply

< Methods

Valves

Inlets

Columns

Oven

Thermal Zones

Detectors

Analog Out

Events

Inlet 1 - SSL Intuvo Flow Path

Control Mode

	Setpoint	Actual
<input type="checkbox"/> Heater	50.00 °C	29.42 °C
<input type="checkbox"/> Pressure	15.023 psi	10.465 psi
<input type="checkbox"/> Septum Purge Flow	3.000 mL/min	-0.111 mL/min

Septum Purge Flow Mode: Standard

Pre-Run Flow Test Continue on Failure

High pressure mode
Low.

Enable a split vent

High pressure required
before beginning the

Self Aware GC Features

- User Initiated Diagnostics
- **Autonomous Diagnostics**
- Autonomous Configuration
- Self Guided Diagnostics
- Traditional Early Diagnostics
- Self Guided Maintenance

The screenshot shows a 'System Settings' dialog box with a left sidebar containing menu items: Network, Date and Time, Locale, Power Saving, Remote Advisor, **Miscellaneous**, System Setup, and Reset. The main area has two tabs: 'Method' (selected) and 'Storage'. Under the 'Method' tab, there is a 'Method Settings' section with two options: 'Load Last Loaded Method on Power On' (unchecked) and 'Run Split Vent Trap Test after 100 runs and 30 min of sequence inactivity.' (checked).

and pressure mode
down.

ate a split vent

pressure required
before beginning the

Self Aware GC Features

- User Initiated Diagnostic Tests
- Autonomous Diagnostic Tests
- **Autonomous Continuous Monitoring**
- Self Guided Diagnostic Troubleshooting
- Traditional Early Maintenance Feedback (I)
- Self Guided Maintenance Procedures

Firmware continuously monitors and reports

- Detector
 - Supply Voltage
 - ADC References
 - FID Flameout
 - NPD Bead Open/Short
 - Igniter Open/Short
 - Collector Shorted
- Electronic Pneumatic Control (EPC)
- Thermal
 - Sensor Short
 - Open Sensor
 - Missing Heater
 - Wrong Heater
- Heater Current
 - Quiescent
 - Leakage
- Configuration mismatch
- Line Voltage Monitor
- Actuator Movements

Self Aware GC Features

- User Initiated Diagnostics
- Autonomous Diagnostics
- **Autonomous Corrections**
- Self Guided Diagnostics
- Traditional Early Detection
- Self Guided Maintenance

Firmware continuously monitors and reports

- Detector Supply Voltage

The screenshot shows a diagnostic window titled "Detector 1 Fuel Gas Shutdown" with a help icon. It includes a search bar with the same text, a "Details" section, and a "Clear Shutdown" button. The details section contains the following information:

- Error Code** 20700
- Cause** The pneumatic channel cannot maintain flow.
- Effect** All detector gases are shut off.
- Suggested Resolution**
 - Check supply line is connected and pressurized
 - Check the correct gas type is connected
 - Check for leaks or restrictions in the detector

- Actuator Movements

Self Aware GC Features

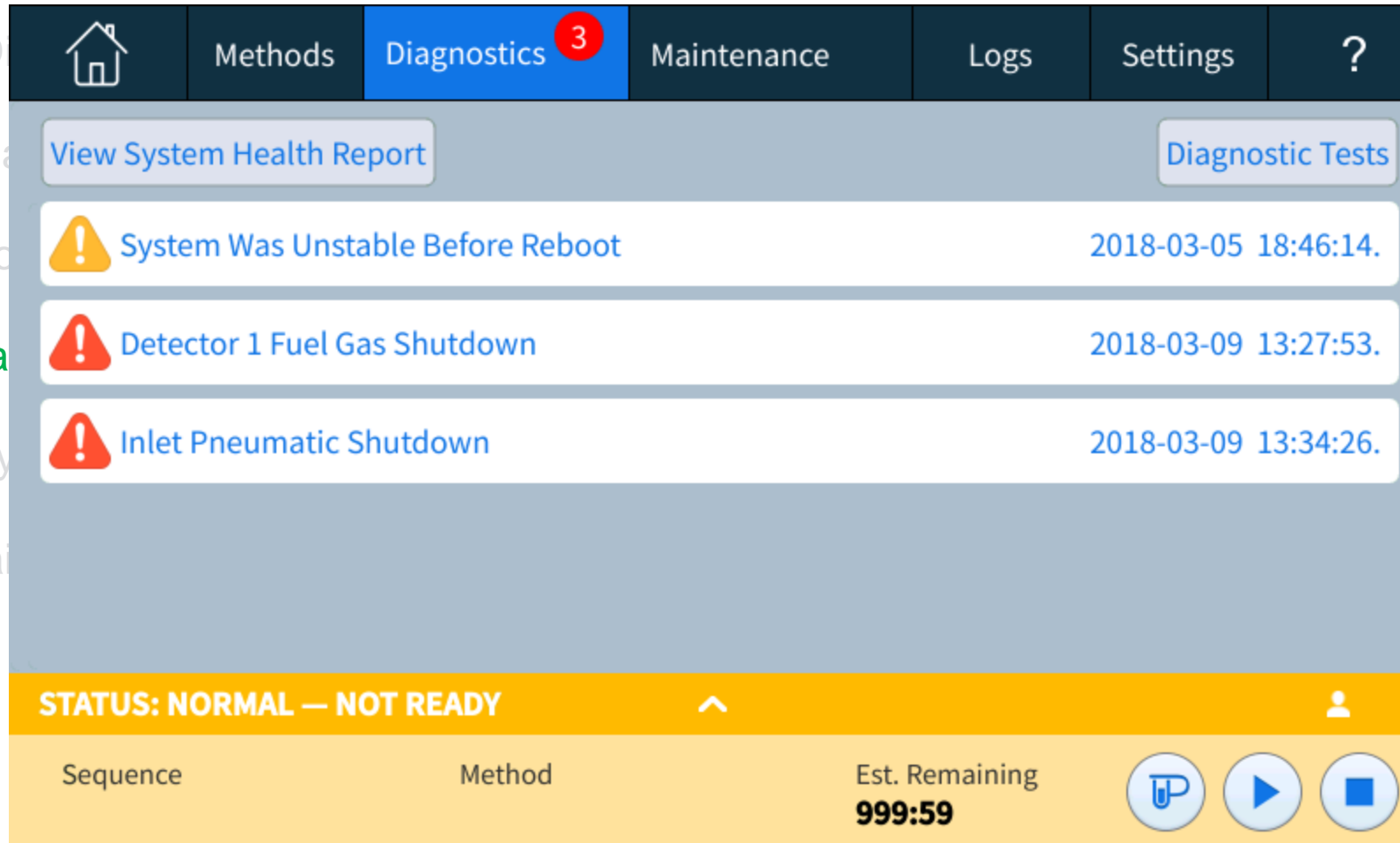
- User Initiated Diagnostic Tests
- Autonomous Diagnostic Tests
- Autonomous Continuous Monitoring
- **Self Guided Diagnostic Troubleshooting**
- Traditional Early Maintenance Feedback (E
- Self Guided Maintenance Procedures

A subset of conditions have troubleshooting trees defined onboard to aide the user to a resolution

Inlet Pressure Shutdown
System Unstable
Installation Inconsistencies
Tray Firmware Installation
Missing Flow Chip Information
Thermal Faults
Configuration Faults

Self Aware GC Features

- User Initiated D
- Autonomous Di
- Autonomous Co
- Self Guided Dia
- Traditional Early
- Self Guided Ma



View System Health Report

Diagnostic Tests

System Was Unstable Before Reboot 2018-03-05 18:46:14.

Detector 1 Fuel Gas Shutdown 2018-03-09 13:27:53.

Inlet Pneumatic Shutdown 2018-03-09 13:34:26.

STATUS: NORMAL — NOT READY

Sequence Method Est. Remaining **999:59**

es defined onboard

Self Aware GC Features

- User Initiated Diagnostics
- Autonomous Diagnostics
- Autonomous Control
- Self Guided Diagnostics
- Traditional Early Detection
- Self Guided Maintenance

< Available Diagnostics **Inlet Pneumatic Shutdown** ?

Attention

Inlet Pneumatic Shutdown (Pressure or flow cannot be maintained)

Details

Error Code	100
Cause	Inlet cannot maintain pressure or flow.
Effect	All inlet flows are shut off.
Suggested Resolution	Clear the shutdown using the button below. Edit the method or resolve the hardware defect. Or use the built in diagnostic tools to assist in troubleshooting.

Clear Shutdown Diagnose

es defined onboard

Self Aware GC Features

- User Initiated Diagnostic
- Autonomous Diagnostic
- Autonomous Configuration
- **Self Guided Diagnostic**
- Traditional Early Diagnostic
- Self Guided Maintenance

< Available Diagnostics **Inlet Pneumatic Shutdown** ?

Attention

User input required to continue.

Tests run with this diagnostic

- Verify EPC Hardware & Communication
- Verify User Zero Calibration
- Verify Gas and Column Configuration
- Verify Temperature and Voltages
- Splitless Leak Test
- Verify Septum Purge Valve

Abort Next

Tests defined onboard

Self Aware GC Features

- User Initiated Diagnostic Tests
- Autonomous Diagnostic Tests
- Autonomous Continuous Monitoring
- Self Guided Diagnostic Troubleshooting
- **Traditional Early Maintenance Feedback (EMF) counters**
- Self Guided Maintenance Procedures

A continuation of the 7890 implementation of EMF counters, several new counters were also introduced

52 counters supported

New Counters

Guard chip injections

Guard chip age

Detector tail injections

Detector tail age

NPD Applied bead current

Actuations

Disk usage

Instrument run time

Bus Injections

Bus Run count

Bus Time over max temperature

Bus Max applied temperature

Bus On time

Self Aware GC Features

A continuation of the 7890 implementation of EMF counters, several new counters were also introduced

- User Initiated Diagnostic
- Autonomous Diagnostic
- Autonomous Control
- Self Guided Diagnostic
- Traditional Early Maintenance
- Self Guided Maintenance

The screenshot displays the 'Maintenance' tab of a GC control interface. The navigation bar includes Home, Methods, Diagnostics (with a notification badge '1'), Maintenance (selected), Logs, Settings, and Help. The main content area is titled 'Maintenance' and features a 'View Logs' button. Six maintenance items are listed in a grid, each with a green checkmark indicating a successful status: Inlets, Columns, Intuvo Flow Chips, Detectors, Instrument, and Valves. A green status bar at the bottom reads 'STATUS: NORMAL — WAITING FOR PREP RUN ^'. Below this, a control bar shows 'Sequence', 'Method', and 'Est. Remaining 999:59' with icons for a beaker, play, and stop.

ent

temperature
temperature

Self Aware GC Features

A continuation of the 7890 implementation of EMF counters, several new counters were also introduced

- User Initiated Diag
- Autonomous Diag
- Autonomous Cont
- Self Guided Diag
- **Traditional Early M**
- Self Guided Maint

The screenshot shows the 'Inlet Maintenance' interface. At the top, there is a navigation bar with '< Overview', 'Inlet Maintenance', a help icon '?', and 'Perform Maintenance'. Below this is a table for 'Inlet 1' with columns 'Part' and 'Status'. The table contains four rows, each with a green checkmark icon in the 'Part' column. At the bottom of the interface, there is a green status bar that reads 'STATUS: NORMAL — WAITING FOR PREP RUN ^' and a bottom control bar with 'Sequence', 'Method', 'Est. Remaining 999:59', and three icons: a beaker with 'P', a play button, and a stop button.

Part	Status
✓ Guard chip age	2 wk 6 d
✓ Guard chip injections	0 injections
✓ Liner age	2 wk 6 d
✓ Liner injections	0 injections

STATUS: NORMAL — WAITING FOR PREP RUN ^

Sequence Method Est. Remaining **999:59**

Self Aware GC Features

A continuation of the 7890 implementation of EMF counters, several new counters were also introduced

- User Initiated Diag
- Autonomous Diag
- Autonomous Cont
- Self Guided Diag
- **Traditional Early M**
- Self Guided Maint

The screenshot displays the 'Inlet Maintenance' interface. At the top, there is a navigation bar with '< Overview', 'Inlet Maintenance', a help icon '?', and 'Perform Maintenance'. Below this is a list of maintenance items, each with a green checkmark: 'Guard chip age', 'Guard chip injectio', 'Liner age', and 'Liner injections'. A modal dialog titled 'Guard chip age Settings' is open in the center. It contains two columns: 'Service Warning (days)' with a value of 72 and an 'Enable' checkbox; and 'Service Due (days)' with a value of 90 and an 'Enable' checkbox. At the bottom of the dialog are 'Apply' and 'Reset Counter' buttons. The background interface shows a 'STATUS: NORMAL' bar and a table with columns for 'Sequence', 'Method', and 'Est. Remaining' (showing 999:59). There are also control icons for a test tube, play, and stop.

Self Aware GC Features

- User Initiated Diagnostic Tests
- Autonomous Diagnostic Tests
- Autonomous Continuous Monitoring
- Self Guided Diagnostic Troubleshooting
- Traditional Early Maintenance Feedback (EMF)
- **Self Guided Maintenance Procedures**

Onboard procedures that provide the user with step-by-step instructions for performing maintenance. The service prepares the instrument by cooling zones, validates the work using diagnostic tests, and resets relevant EMF counters.

Inlet Replace Septa
Inlet Replace Liner
Inlet Replace Guard Chip
Inlet Replace Split Vent Trap
Inlet MMI Bleed Cryo Lines
Column Change Column
Detector Replace Detector Tail
Detector Replace FID Jet
Instrument Maintenance Mode

Self Aware GC Features

- User Initiated Diagnostic
- Autonomous Diagnostic
- Autonomous Configuration
- Self Guided Diagnostic
- Traditional Early Warning
- **Self Guided Maintenance**

< Overview **Inlet Maintenance** ?

Self guided procedures for performing inlet maintenance

Provide Inputs:

<input type="checkbox"/> Replace Septum	<input type="checkbox"/> Replace Liner and O-Ring
<input type="checkbox"/> Replace Split Vent Trap	<input type="checkbox"/> Replace Guard Chip

Start Maintenance

step-by-step service prepares the GC using diagnostic

Self Aware GC Features

- User Initiated Diagnostic
- Autonomous Diagnostic
- Autonomous Control
- Self Guided Diagnostic
- Traditional Early Warning
- **Self Guided Maintenance**

The screenshot shows a mobile application interface for 'Inlet Maintenance'. At the top, there is a header with '< Overview', 'Inlet Maintenance', and a question mark icon. Below the header, the main task is 'Replace Guard Chip'. A large white box contains the instruction 'Collect tools needed to perform the maintenance'. Underneath, a section titled 'Tools' lists the following items: '7/16-inch open-end wrench', 'Torque Driver', and 'Lint-free gloves'. At the bottom of the interface, there are two buttons: 'Abort' and 'Next'.

step-by-step service prepares the GC using diagnostic

Self Aware GC Features

- User Initiated Diagnostic
- Autonomous Diagnostic
- Autonomous Configuration
- Self Guided Diagnostic
- Traditional Early Warning
- **Self Guided Maintenance**


< Overview **Inlet Maintenance** ?

Replace Guard Chip

Preparing for maintenance, cooling down the heated zones...

Procedure

Waiting for these zones to become ready. Estimated time remaining : 8.7 minutes

Zone	Threshold	Actual
Inlet	50 C	92.030 C 
Guard Chip	50 C	28.750 C
Bus	50 C	30.730 C
Little Bus	50 C	30.790 C
Column Connector 1	50 C	29.310 C

Abort Ignore Ready

step-by-step service prepares the GC using diagnostic

Self Aware GC Features

- User Initiated Diagnostic
- Autonomous Diagnostic
- Autonomous Configuration
- Self Guided Diagnostic
- Traditional Early Warning
- Self Guided Maintenance

Inlet Maintenance ?

Replace Guard Chip

Open the guard chip cover

Procedure

1. Open the front door.
2. Remove the bus door.
3. Slide out the oven cover.

Abort Back Next

step-by-step
service prepares the
using diagnostic

The Browser Interface Allows Access to Everything the Touchscreen Does

While you are comfortably seated at your desk

- Accessible from Desktop, Laptop, or Tablet
- Outside Internet **NOT** required
 - Access via Corp. LAN
 - Can use wireless access pt.

The Browser Interface Allows Access to Everything the Touchscreen Does

While you are comfortably seated at your desk

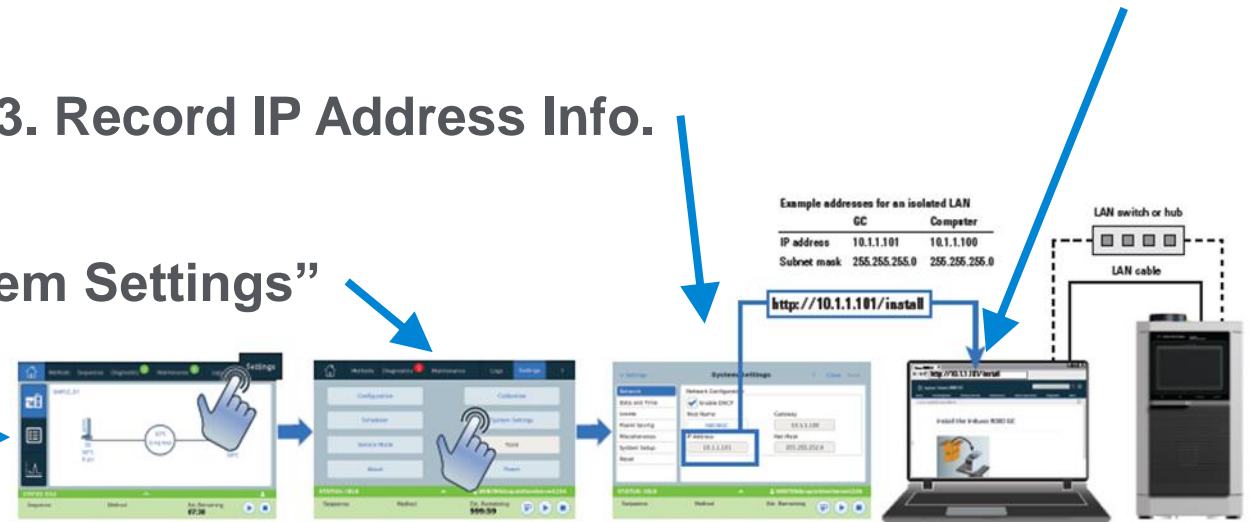
- Accessible from Desktop, Laptop, or Tablet
- Outside Internet **NOT** required
 - Access via Corp. LAN
 - Can use wireless access pt.

4. Enter into your browser address bar

3. Record IP Address Info.

2. Select “System Settings”

1. Access “Settings” tab



The Browser Interface Allows Access to Everything the Touchscreen Does

While you are comfortably seated at your desk

- Accessible from Desktop, Laptop, or Tablet
- Outside Internet **NOT** required
 - Access via Corp. LAN
 - Can use wireless access pt.

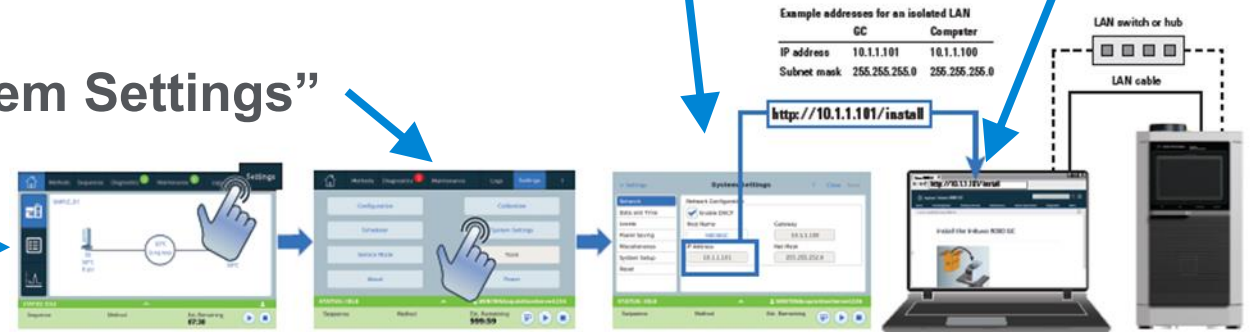
Security
provided by your
Corporate IT Infrastructure.
(LAN, Corporate Intranet, VPN, etc.)

4. Enter into your browser address bar

3. Record IP Address Info.

2. Select “System Settings”

1. Access “Settings” tab



The Browser Interface Allows Access to Everything the Touchscreen Does

While you are comfortably seated at your desk

- Accessible from Desktop, Laptop, or Tablet
- Outside Internet **NOT** required
 - Access via Corp. LAN
 - Can use wireless access pt.

GC SW Intuvo - Acquisition

File Home Control GC Plugins

Status Method Single Sample Sequence

Layouts Windows

Acquisition Method - Untitled

General Properties Instrument Setup Agilent 9000

Flow Path

SS Inlet 33.7 psi [33.7 psi] 300 °C [300 °C] Guard Chip: 125 °C [125 °C]

Column #1 100 °C [100 °C] 6.5 mL/min

Detector 1 FID 300.1 °C [300 °C]

Intuvo 9000 GC Links

Help & Information

Browser Interface

Injector

Injection Syringe Size: 10 µL

Injection Volume: 1 µL

Washes and Pumps

	PreInj	PostInj	Volume (µL)
Solvent A Washes:	0	1	Max
Solvent B Washes:	0	1	Max
Sample Washes:	0		Max
Sample Pumps:	6		

Dwell Time

Pre-Injection: 0 min

Post-Injection: 0 min

Sample Depth

Enable 0 mm

Plunger Speed (Variable)

Fast Slow Variable

Draw

Solvent Wash	300 µL/min	6000
Sample Wash	300 µL/min	6000
Inject		6000

Viscosity Delay: 0 sec

GC SW Intuvo - Idle

Current user: SYSTEM, Active project: George

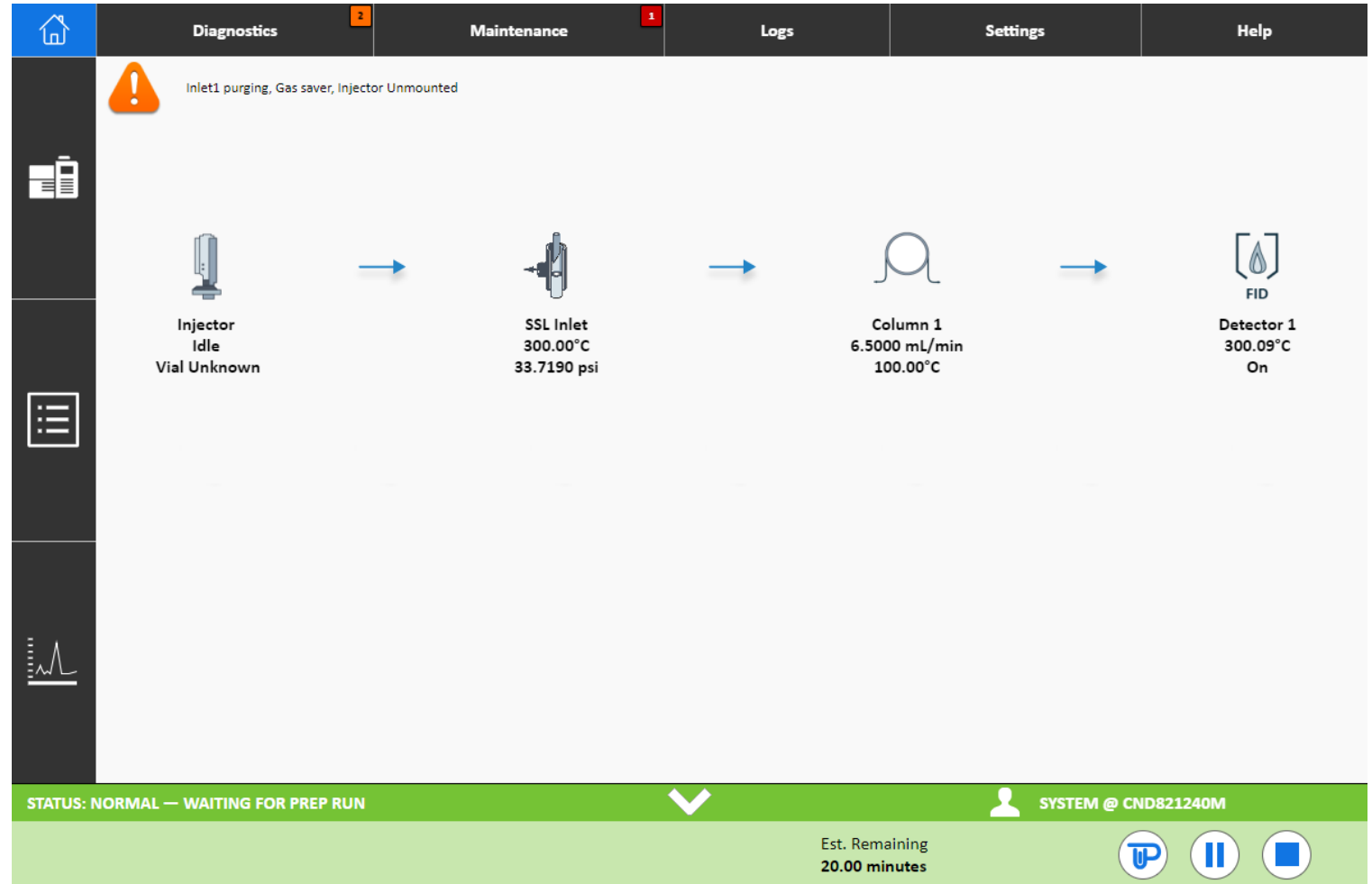
2. Sele

1. Access "Settings"

The Browser Interface Allows Access to Everything the Touchscreen Does

While you are comfortably seated at your desk

- Accessible from Desktop, Laptop, or Tablet
- Outside Internet **NOT** required
 - Access via Corp. LAN
 - Can use wireless access pt.
- From your browser, access...
 - Home status screens
 - Diagnostic tests
 - Maintenance (EMFs)
 - Logs
 - Help & Information



The Browser Interface Allows Access to Everything the Touchscreen Does

While you are comfortably seated at your desk

- Accessible from Desktop, Laptop, or Tablet
- Outside Internet **NOT** required
 - Access via Corp. LAN
 - Can use wireless access pt.
- From your browser, access...
 - Home status screens
 - Diagnostic tests
 - Maintenance (EMFs)
 - Logs
 - Help & Information

The screenshot displays a web-based diagnostic interface. At the top, a navigation bar includes a home icon, 'Diagnostics' (highlighted in blue), 'Maintenance', 'Logs', 'Settings', and 'Help'. The main content area is titled 'Leak & Restriction Test' with the subtitle 'Controlling inlet in Splitless mode at Constant Flow'. Below this is a schematic diagram of the gas chromatography system, showing components: Gas Supply, Septum Purge, Split Vent, Guard/Inlet Chips, and Column. A text box on the left of the diagram states 'Ok will update the tests info in the System Health Report'. An 'OK' button is positioned below the diagram. At the bottom of the interface, a yellow status bar shows 'STATUS: DIAGNOSTIC MODE — NOT READY', a dropdown arrow, 'SYSTEM @ CND821240M', and 'Est. Remaining 0.00 minutes'. On the far right of the status bar are three circular icons: a blue 'TP' icon, a blue pause icon, and a blue square icon.

The Browser Interface Allows Access to Everything the Touchscreen Does

While you are comfortably seated at your desk

- Accessible from Desktop, Laptop, or Tablet
- Outside Internet **NOT** required
 - Access via Corp. LAN
 - Can use wireless access pt.
- From your browser, access...
 - Home status screens
 - Diagnostic tests
 - Maintenance (EMFs)
 - Logs
 - Help & Information

The screenshot displays the 'Inlet Maintenance' section of a web interface. At the top, there is a navigation bar with tabs for 'Diagnostics', 'Maintenance', 'Logs', 'Settings', and 'Help'. The 'Maintenance' tab is selected, and a 'Perform Maintenance' link is visible on the right. Below the navigation bar, the page title is '< Overview Inlet Maintenance'. The main content area is titled 'Inlet 1 SS' and contains a table with the following data:

Part	Status	Details	Reset
Guard chip age	32 weeks 6 days	Details	Reset
Guard chip injections	44 (injections)		
Liner age	25 weeks 4 days		
Liner injections	9 (injections)		
Liner o-ring age	1 year 0 minutes		
Liner o-ring injections	215 (injections)		
Septum injections	3 (injections)		
Split vent trap age	1 year 21 weeks		
Split vent trap injections	215 (injections)		

At the bottom of the interface, a green status bar shows 'STATUS: NORMAL — WAITING FOR PREP RUN' with a checkmark icon, 'SYSTEM @ CND821240M', and 'Est. Remaining 20.00 minutes'. There are also icons for 'TP', 'Pause', and 'Stop'.

The Browser Interface Allows Access to Everything the Touchscreen Does

While you are comfortably seated at your desk

- Accessible from Desktop, Laptop, or Tablet
- Outside Internet **NOT** required
 - Access via Corp. LAN
 - Can use wireless access pt.
- From your browser, access...
 - Home status screens
 - Diagnostic tests
 - Maintenance (EMFs)
 - Logs
 - Help & Information

Date	Notes
14-Sept-18 3:52 PM	Inlet 1 , Liner o-ring age service due
14-Sept-18 3:49 PM	Completed: Inlet Maintenance (Replace Septum)
14-Sept-18 3:49 PM	Inlet 1 , Septum injections serviced
14-Sept-18 3:43 PM	Completed: Column 1 Maintenance (Replace Column)
14-Sept-18 3:43 PM	Column 1 installed 19091S-413UI-INT (US17390205)
7-Aug-18 3:05 PM	Injector 1 installed (CN12330022)
6-Apr-18 2:15 PM	Inlet 1 , Septum injections serviced

STATUS: NORMAL — WAITING FOR PREP RUN

SYSTEM @ CND821240M

Est. Remaining 20.00 minutes

The Browser Interface Allows Access to Everything the Touchscreen Does

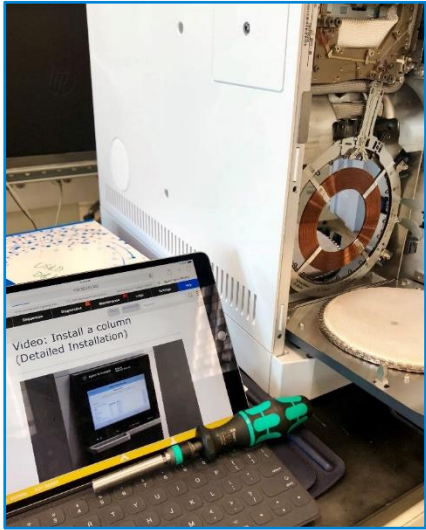
While you are comfortably seated at your desk

- Accessible from Desktop, Laptop, or Tablet
- Outside Internet **NOT** required
 - Access via Corp. LAN
 - Can use wireless access pt.
- From your browser, access...
 - Home status screens
 - Diagnostic tests
 - Maintenance (EMFs)
 - Logs
 - Help & Information

The screenshot displays the Agilent browser interface. At the top, there is a navigation bar with tabs for 'Diagnostics' (with a red '2'), 'Maintenance' (with a red '1'), 'Logs', 'Settings', and 'Help'. Below the navigation bar is a search bar with 'History' and 'Show/Hide Help' buttons. The main content area is titled 'Help & Information Home' and features three large tiles: 'Knowledgebase' (with a stack of documents), 'Getting Started' (with a traffic light icon), and 'Maintenance' (with a wrench and screwdriver icon). Below these tiles are three smaller preview windows: a diagnostic test screen showing 'SIMPLE_D1' with a hand cursor, a machine status screen showing 'STATUS: NORMAL — WAITING FOR PREP RUN' and 'Est. Remaining 20.00 minutes', and a 'Browser UI Help' screen. The bottom of the interface shows a system status bar with 'SYSTEM @ CND821240M' and control icons for 'UP', 'Pause', and 'Stop'.

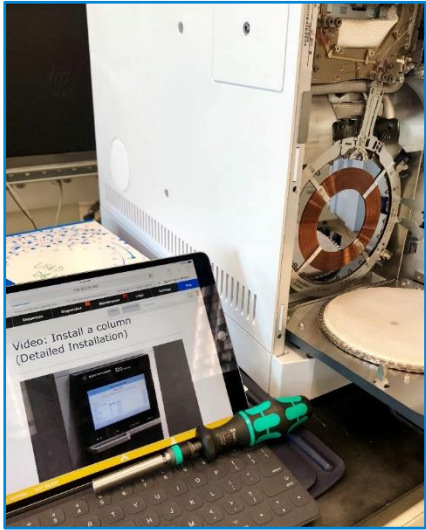
The Agilent GC Browser Interface

A convenient way to access your smart GC



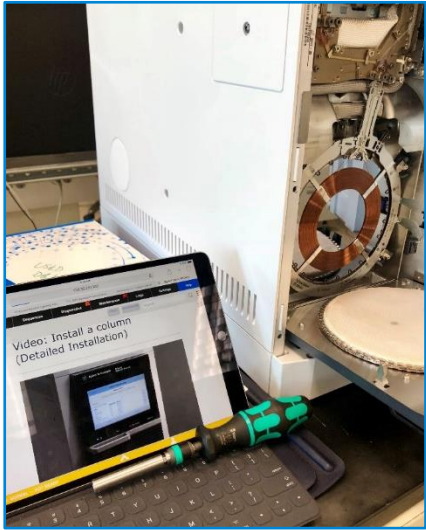
The Agilent GC Browser Interface

A convenient way to access your smart GC



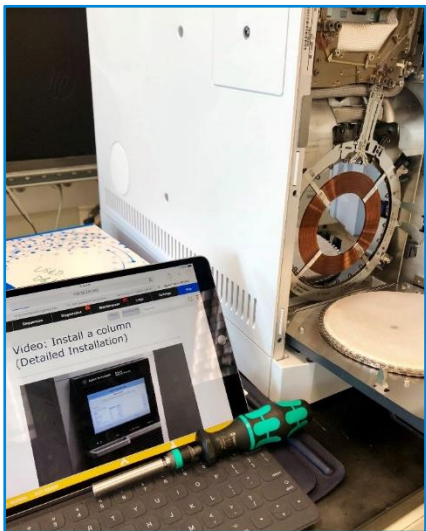
The Agilent GC Browser Interface

A convenient way to access your smart GC



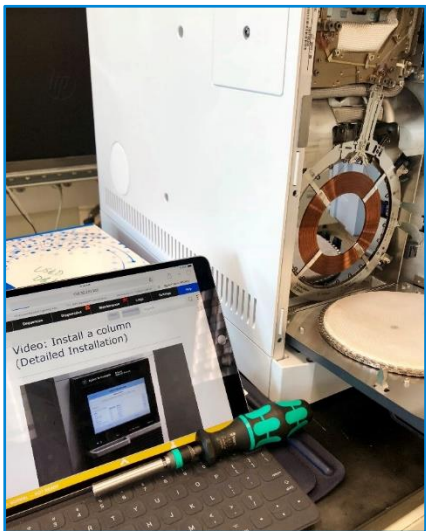
The Agilent GC Browser Interface

A convenient way to access your smart GC



The Agilent GC Browser Interface

A convenient way to access your smart GC



The Agilent GC Browser Interface

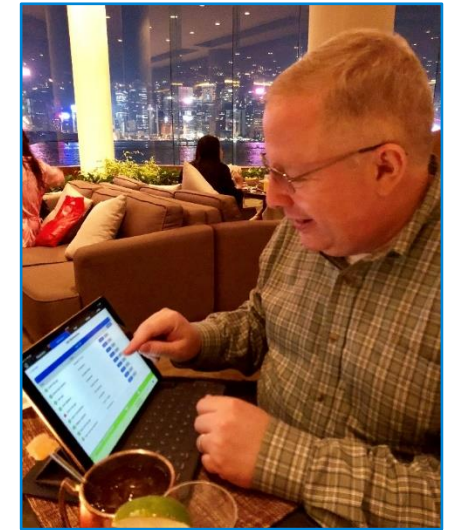
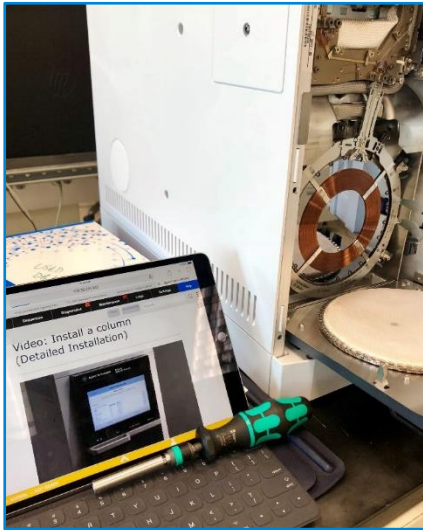
A convenient way to access your smart GC



- You might not access your Smart GC from a boat or from Hong Kong

The Agilent GC Browser Interface

A convenient way to access your smart GC



- You might not access your Smart GC from a boat or from Hong Kong
- But you can access it from wherever your network allows
 - Distant worksites sharing information
 - Remote sites being serviced from a technical center

On-Board Expanded Help & Information

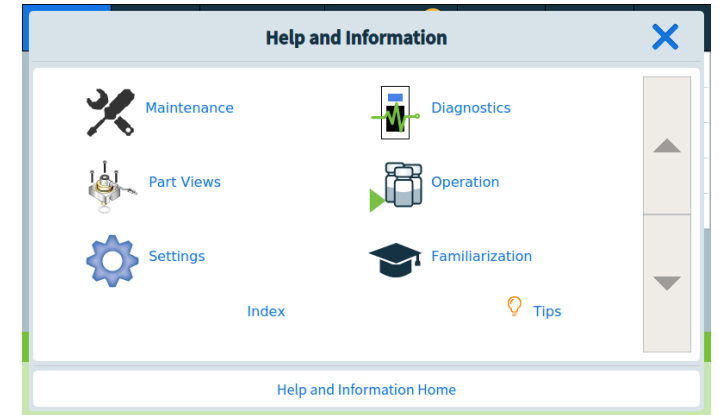
Making help more helpful

- Customized for touchscreen and browser interfaces (also accessible from GC Drivers)

On-Board Expanded Help & Information

Making help more helpful

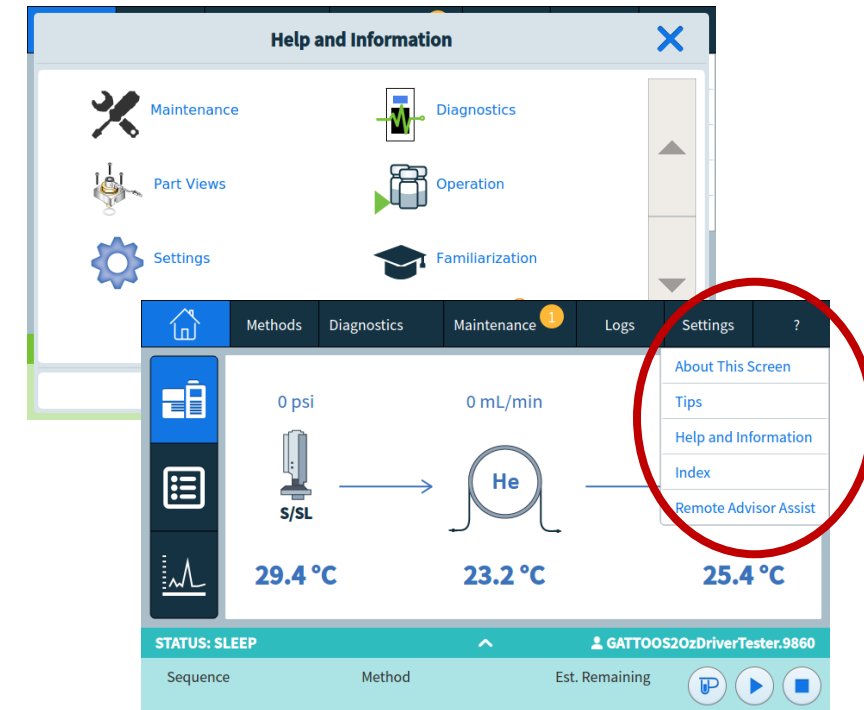
- Customized for touchscreen and browser interfaces (also accessible from GC Drivers)



On-Board Expanded Help & Information

Making help more helpful

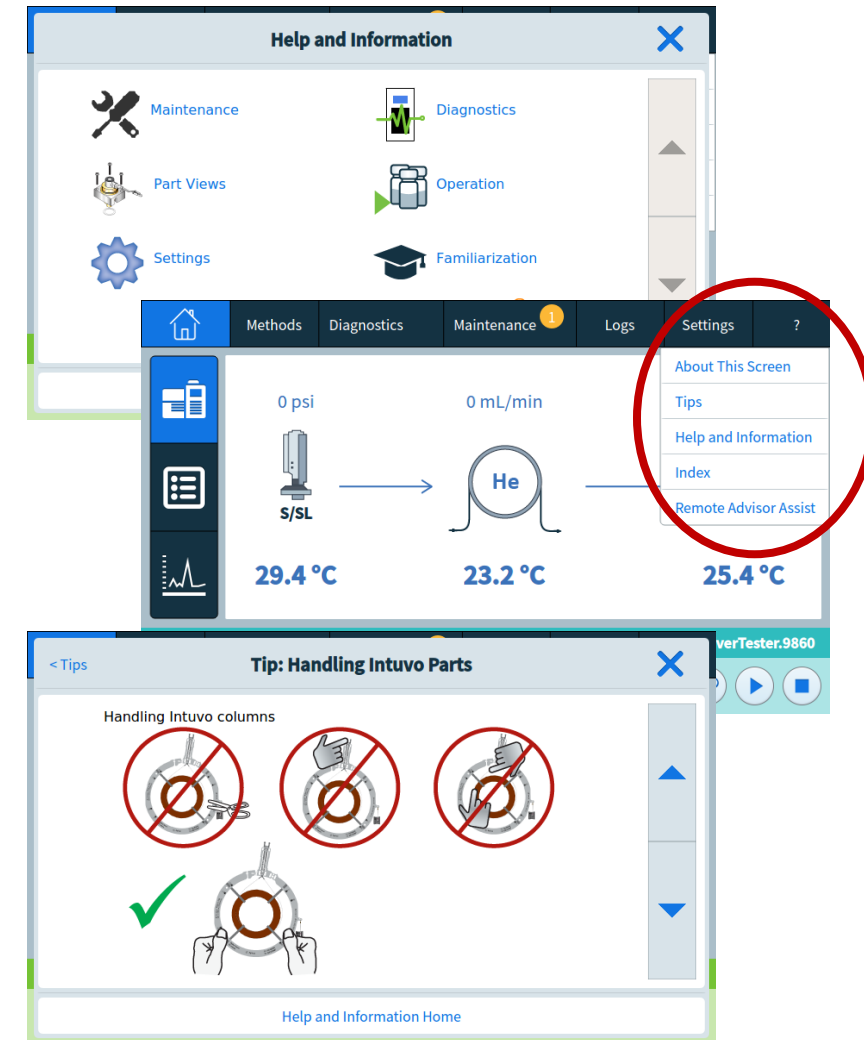
- Customized for touchscreen and browser interfaces (also accessible from GC Drivers)



On-Board Expanded Help & Information

Making help more helpful

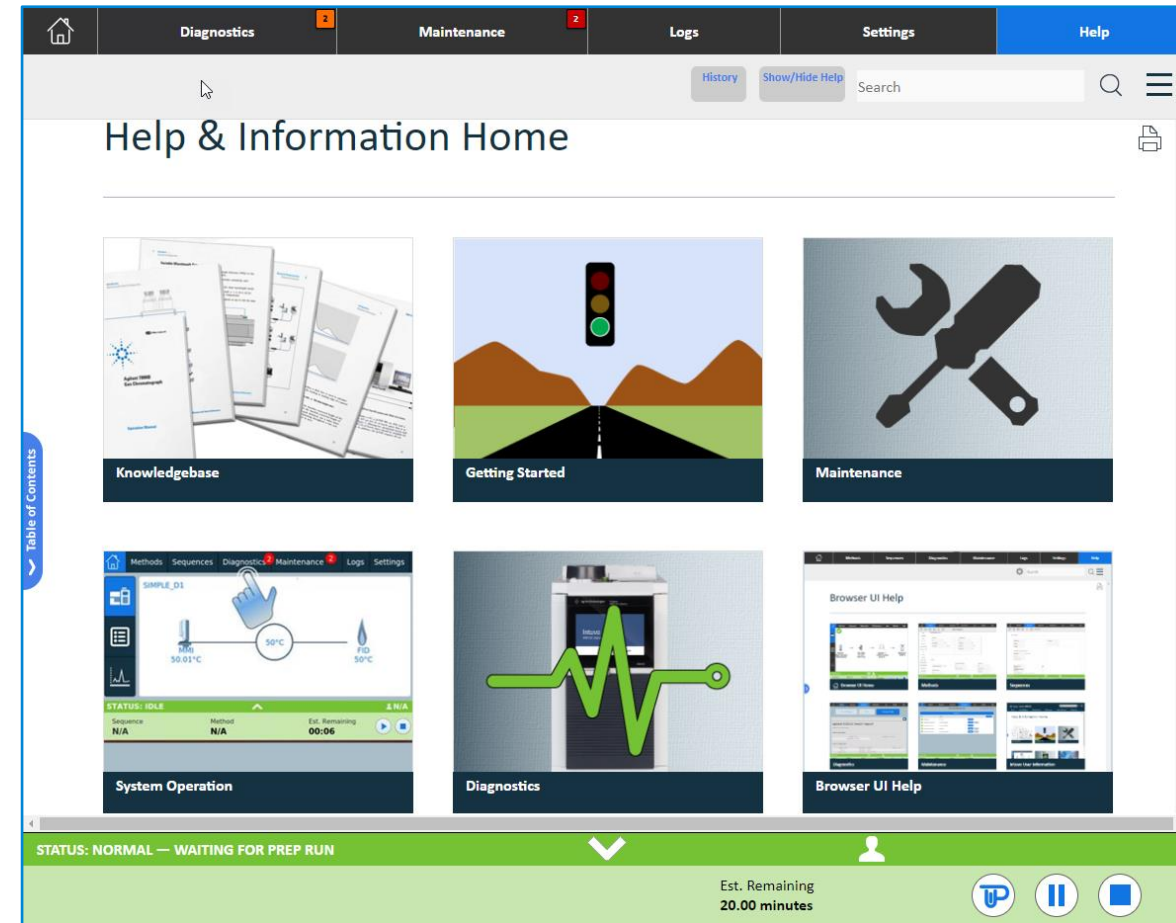
- Customized for touchscreen and browser interfaces (also accessible from GC Drivers)



On-Board Expanded Help & Information

Making help more helpful

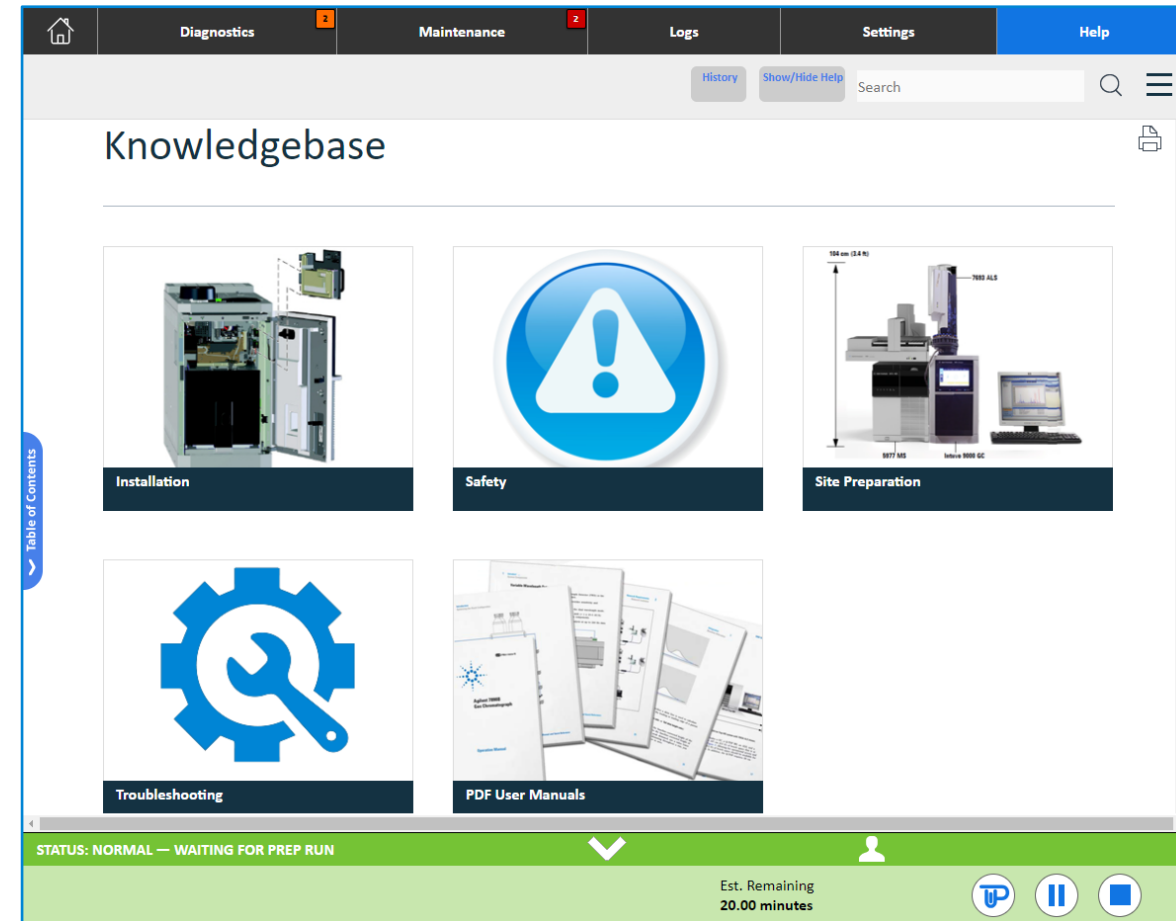
- Customized for touchscreen and browser interfaces (also accessible from GC Drivers)
- Table of Contents, History and Search



On-Board Expanded Help & Information

Making help more helpful

- Customized for touchscreen and browser interfaces (also accessible from GC Drivers)
- Table of Contents, History and Search
- Contains...
 - Knowledge Base (manuals, site-prep, etc.)
 - Getting Started section is front and center
 - Maintenance Section includes procedures & videos
 - System operation
 - Browser Interface Help
 - Diagnostics procedures
 - Online Resources (Agilent University)



On-Board Expanded Help & Information

Making help more helpful

- Customized for touchscreen and browser interfaces (also accessible from GC Drivers)
- Table of Contents, History and Search
- Contains...
 - Knowledge Base (manuals, site-prep, etc.)
 - Getting Started section is front and center
 - Maintenance Section includes procedures & videos
 - System operation
 - Browser Interface Help
 - Diagnostics procedures
 - Online Resources (Agilent University)

The screenshot displays the Agilent Intuvo 9000 GC on-board help interface. The top navigation bar includes 'Diagnostics', 'Maintenance', 'Logs', 'Settings', and 'Help'. A search bar is located below the navigation bar. The main content area is titled 'Getting Started' and contains six tiles: 'Help & Information Tutorial', 'Quick Start', 'Intuvo 9000 GC Familiarization', 'Feature Tour', 'System Setup Wizard', and 'Setup Videos'. A 'Table of Contents' sidebar is visible on the left. The bottom status bar shows 'STATUS: NORMAL — WAITING FOR PREP RUN', a checkmark, a user icon, and 'Est. Remaining 20.00 minutes'. Control icons for 'TP', 'Pause', and 'Stop' are also present.

On-Board Expanded Help & Information

Making help more helpful

- Customized for touchscreen and browser interfaces (also accessible from GC Drivers)
- Table of Contents, History and Search
- Contains...
 - Knowledge Base (manuals, site-prep, etc.)
 - Getting Started section is front and center
 - Maintenance Section includes procedures & videos
 - System operation
 - Browser Interface Help
 - Diagnostics procedures
 - Online Resources (Agilent University)

Intuvo 9000 GC Familiarization

9000 GC eFamiliarization – New User
Guides you through the basic functions and features of the Intuvo 9000 GC. It is intended for users with some Gas Chromatography knowledge.

9000 GC eFamiliarization – Update User
Guides you through the basic and more advanced functions and features of the Intuvo 9000 GC. It is intended for users that have previous knowledge with Agilent Gas Chromatographs.

Agilent Technologies

Feature Tour

System Setup Wizard

Setup Videos

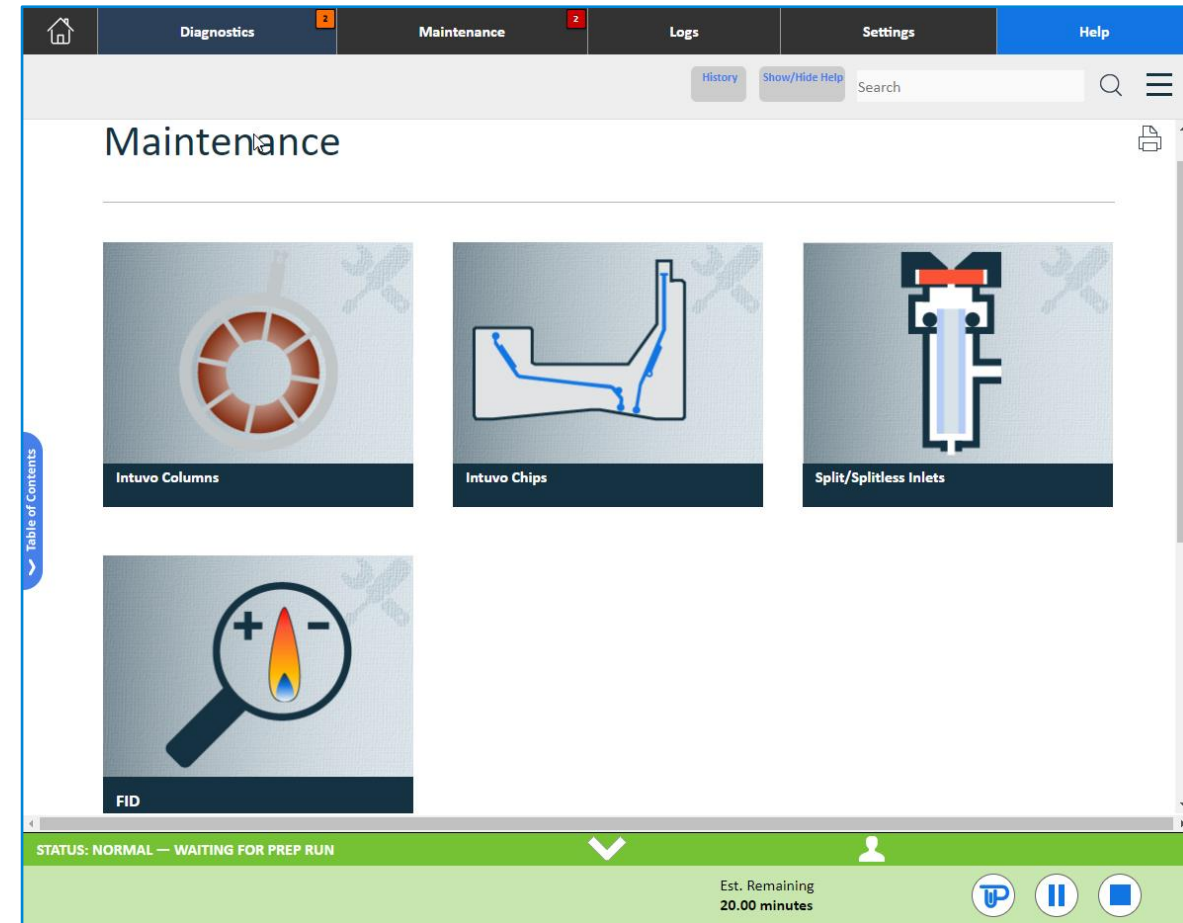
STATUS: NORMAL — WAITING FOR PREP RUN

Est. Remaining 20.00 minutes

On-Board Expanded Help & Information

Making help more helpful

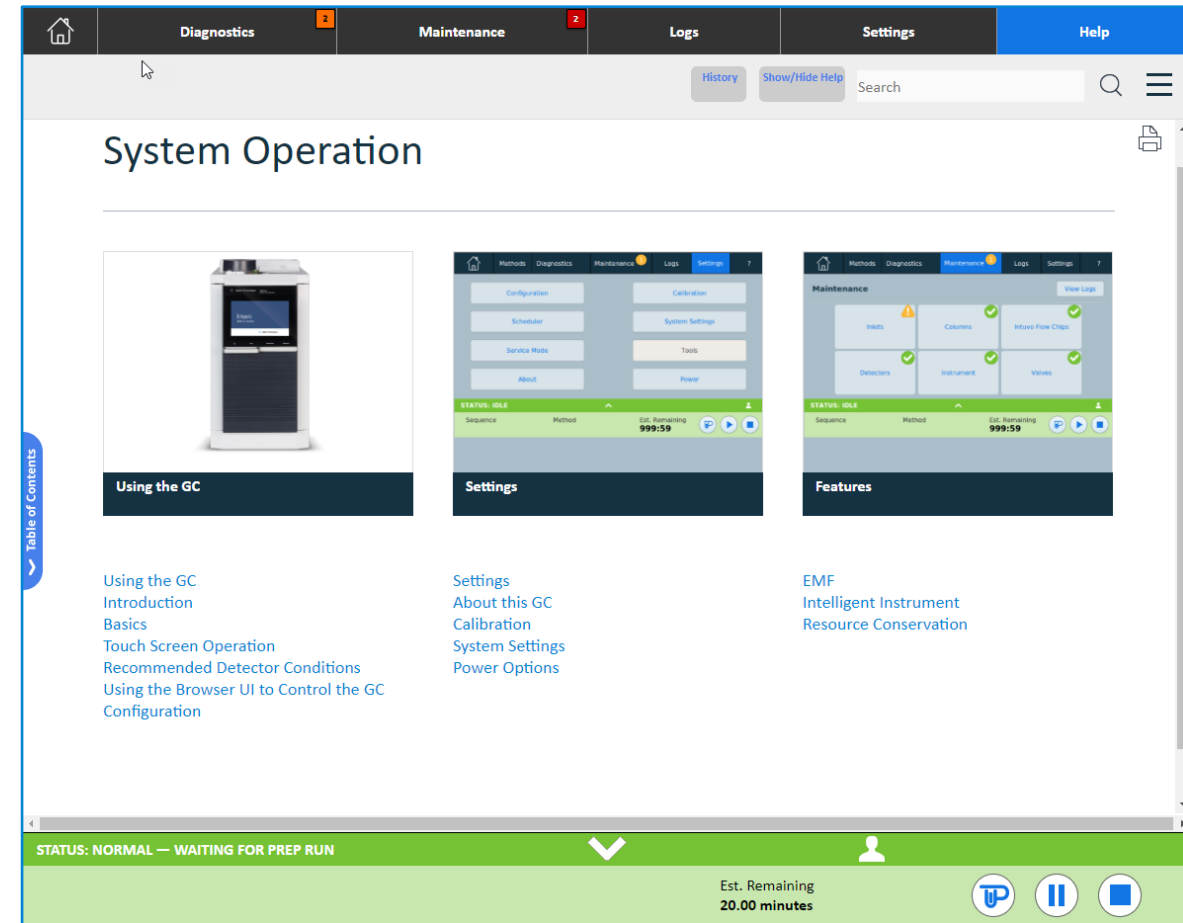
- Customized for touchscreen and browser interfaces (also accessible from GC Drivers)
- Table of Contents, History and Search
- Contains...
 - Knowledge Base (manuals, site-prep, etc.)
 - Getting Started section is front and center
 - Maintenance Section includes procedures & videos
 - System operation
 - Browser Interface Help
 - Diagnostics procedures
 - Online Resources (Agilent University)



On-Board Expanded Help & Information

Making help more helpful

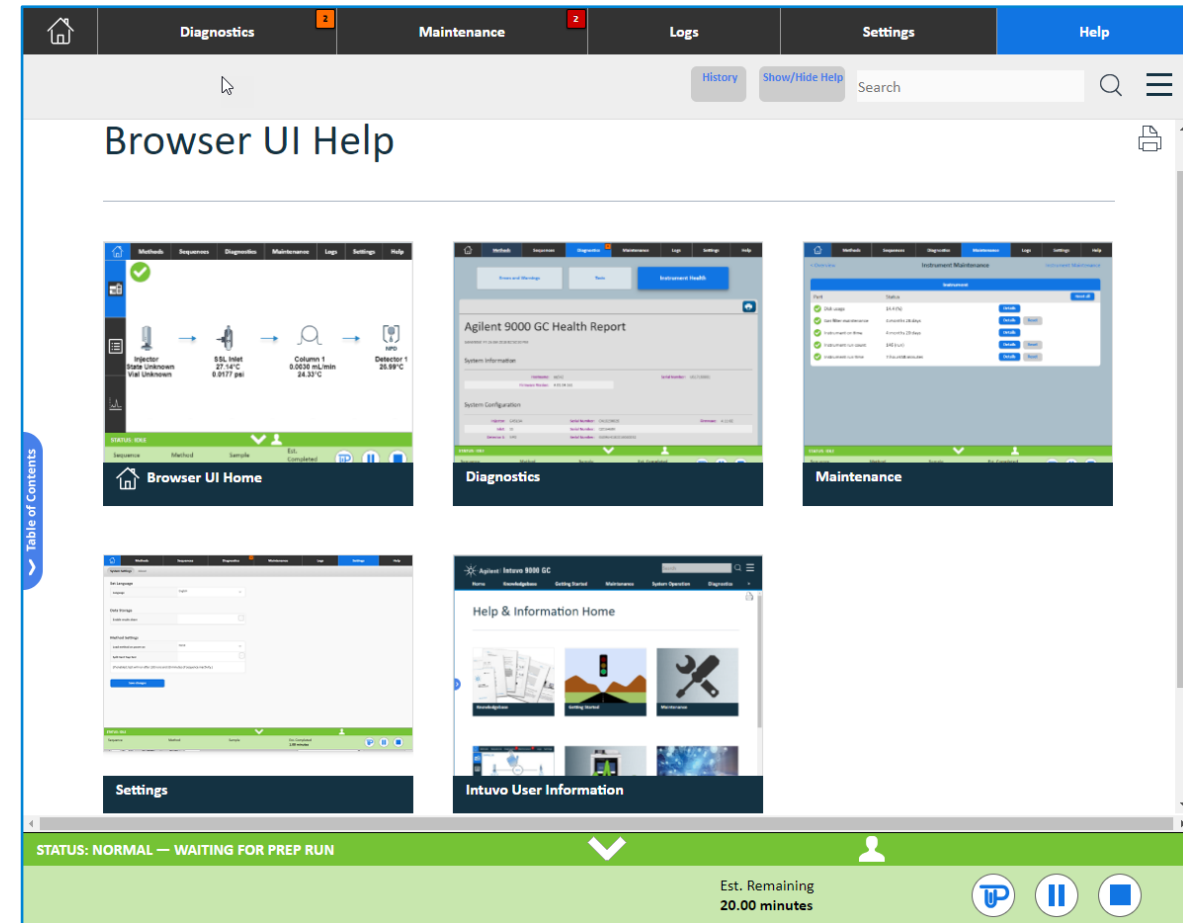
- Customized for touchscreen and browser interfaces (also accessible from GC Drivers)
- Table of Contents, History and Search
- Contains...
 - Knowledge Base (manuals, site-prep, etc.)
 - Getting Started section is front and center
 - Maintenance Section includes procedures & videos
 - System operation
 - Browser Interface Help
 - Diagnostics procedures
 - Online Resources (Agilent University)



On-Board Expanded Help & Information

Making help more helpful

- Customized for touchscreen and browser interfaces (also accessible from GC Drivers)
- Table of Contents, History and Search
- Contains...
 - Knowledge Base (manuals, site-prep, etc.)
 - Getting Started section is front and center
 - Maintenance Section includes procedures & videos
 - System operation
 - Browser Interface Help
 - Diagnostics procedures
 - Online Resources (Agilent University)



On-Board Expanded Help & Information

Making help more helpful

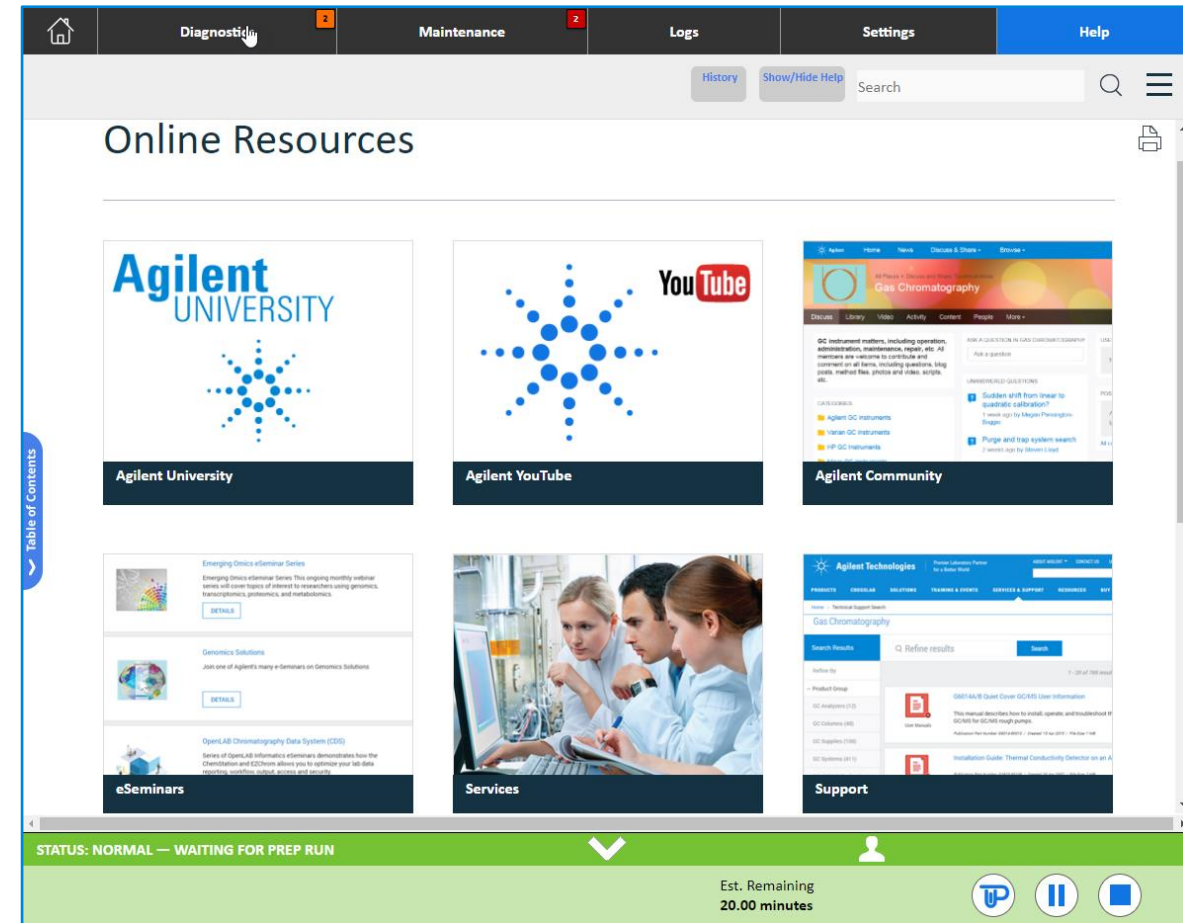
- Customized for touchscreen and browser interfaces (also accessible from GC Drivers)
- Table of Contents, History and Search
- Contains...
 - Knowledge Base (manuals, site-prep, etc.)
 - Getting Started section is front and center
 - Maintenance Section includes procedures & videos
 - System operation
 - Browser Interface Help
 - Diagnostics procedures
 - Online Resources (Agilent University)

The screenshot displays the Agilent GC Diagnostics web interface. At the top, a navigation bar includes icons for Home, Diagnostics (with a red notification badge), Maintenance (with a red notification badge), Logs, Settings, and Help. Below the navigation bar is a search bar with a 'History' button and a 'Show/Hide Help' button. The main content area is titled 'Diagnostics' and features three large, interactive cards: 'Diagnostic Tests' (with a waveform icon), 'Self-Guided Diagnostics' (with a waveform icon and numbered steps 1, 2, and 3), and 'Tasks' (with a checklist icon). Below these cards, there are three columns of text links: 'Diagnostic Tests' (Run GC Diagnostics, Using the GC's diagnostic features, GC Health Report, Gather Log files), 'Inlets' (Split Vent Restriction Test, Tank Pressure Check, Pressure Decay Test, Leak & Restriction Test), and 'Detectors' (Measure an FID Gas Flow, Check for an FID Flame, Check the FID Lit Offset). A 'Communications' section includes 'Check LAN connectivity'. At the bottom, a green status bar shows 'STATUS: NORMAL — WAITING FOR PREP RUN' with a checkmark icon, and 'Est. Remaining 20.00 minutes' with a clock icon. On the far right of the status bar are icons for 'TP', 'Pause', and 'Stop'.

On-Board Expanded Help & Information

Making help more helpful

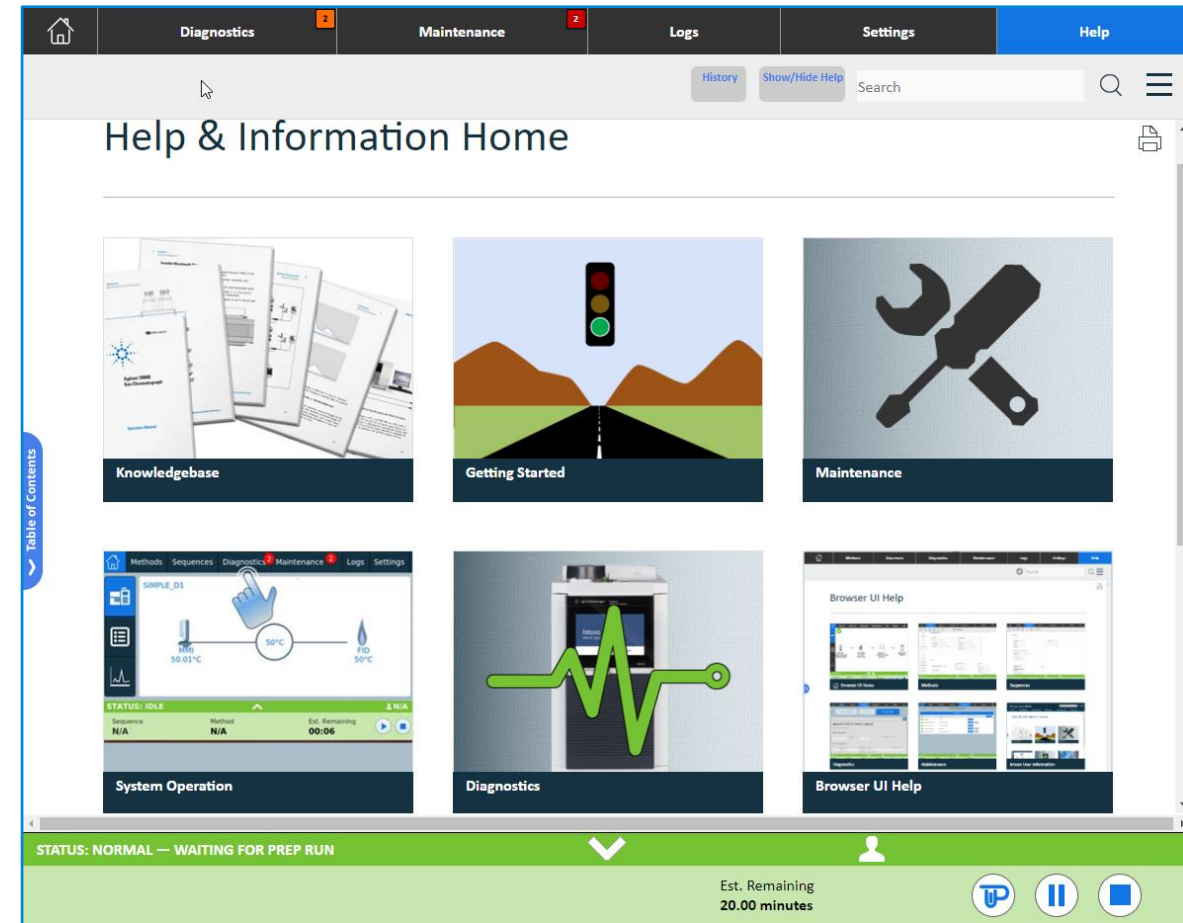
- Customized for touchscreen and browser interfaces (also accessible from GC Drivers)
- Table of Contents, History and Search
- Contains...
 - Knowledge Base (manuals, site-prep, etc.)
 - Getting Started section is front and center
 - Maintenance Section includes procedures & videos
 - System operation
 - Browser Interface Help
 - Diagnostics procedures
 - Online Resources (Agilent University)



On-Board Expanded Help & Information

Making help more helpful

- Customized for touchscreen and browser interfaces (also accessible from GC Drivers)
- Table of Contents, History and Search
- Contains...
 - Knowledge Base (manuals, site-prep, etc.)
 - Getting Started section is front and center
 - Maintenance Section includes procedures & videos
 - System operation
 - Browser Interface Help
 - Diagnostics procedures
 - Online Resources (Agilent University)
- Key Benefit
 - Everything needed to be successful with the instrument is right on-board.



Summary

Your Agilent Intuvo 9000 GC is smarter than you think!

- It has tons of Self-Aware features that help it identify and guide you through maintenance to prevent unplanned downtime.

The screenshot displays the 'Leak & Restriction Test' interface. At the top, there is a navigation bar with '< Overview' and a help icon. The main title is 'Leak & Restriction Test'. Below this, the test mode is set to 'Execute Splitless Leak Test'. A status bar indicates 'Controlling inlet in Splitless mode at Constant Flow'. On the left, a schematic diagram shows the gas flow path: Gas Supply, Guard/Inlet Chips, Column, Septum Purge, and Split Vent. On the right, the 'Test Details' section shows the following data:

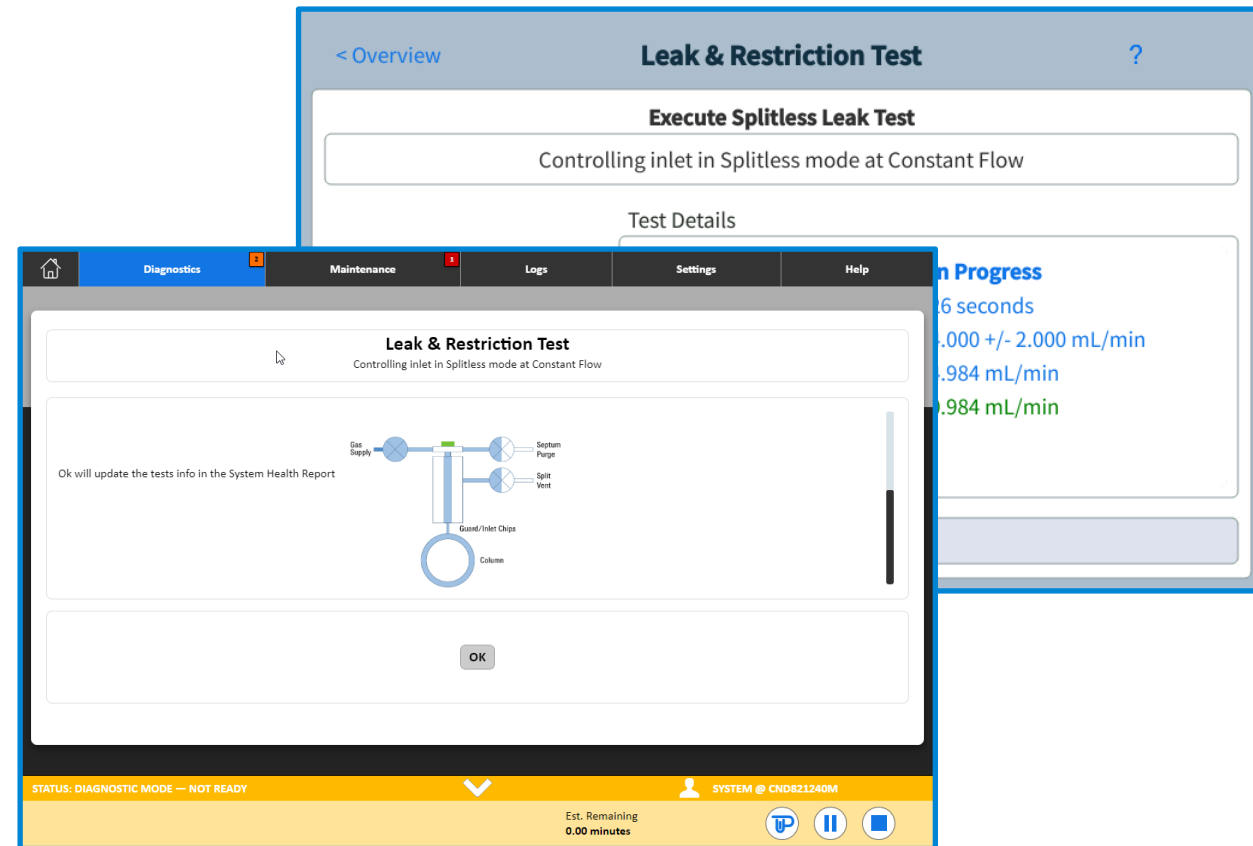
State	In Progress
Time Remaining	26 seconds
Total Flow Target	4.000 +/- 2.000 mL/min
Total Flow Actual	4.984 mL/min
Leak Rate	0.984 mL/min

At the bottom of the interface, there is an 'Abort' button.

Summary

Your Agilent Intuvo 9000 GC is smarter than you think!

- It has tons of Self-Aware features that help it identify and guide you through maintenance to prevent unplanned downtime.
- It has a browser interface that enables you to access your GC and it's self aware content from literally anywhere your corporate IT allows.



Summary

Your Agilent Intuvo 9000 GC is smarter than you think!

- It has tons of Self-Aware features that help it identify and guide you through maintenance to prevent unplanned downtime.
- It has a browser interface that enables you to access your GC and it's self aware content from literally anywhere your corporate IT allows.
- It has an expanded help and information section containing everything you need to be successful with your new smart GC!

The image displays three overlapping screenshots of the Agilent Intuvo 9000 GC web interface. The top screenshot shows the 'Leak & Restriction Test' execution screen, with a progress bar and test details. The middle screenshot shows the 'Leak & Restriction Test' overview screen, featuring a schematic diagram of the GC components. The bottom screenshot shows the 'Help & Information Home' screen, which includes various help and information tiles such as 'Knowledgebase', 'Getting Started', 'Maintenance', 'System Operation', 'Diagnostics', and 'Browser UI Help'. The status bar at the bottom of the interface indicates 'STATUS: DIAGNOSTIC MODE — NOT READY' and 'Est. Remaining 20.00 minutes'.



George Reiner
GC Software Product Manager



Nicole Hart
Outbound Product Marketing Manager