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ANALYTICAL CONTROLS



Sustain2D

JET ANALYZER

GCxGC by ASTM D8396 for Jet Fuel Analysis



In a world where aviation is rapidly shifting toward Synthetic Aviation Turbine Fuels (SATF), success depends on having absolute clarity into composition, compatibility, and quality at every stage of production.

Blends derived from HEFA, FT, ATJ, and other feedstocks each carry distinct molecular fingerprints that go far beyond a routine hydrocarbon analysis. Ensuring jet fuel quality and compatibility requires precise group-type quantification, reliable detection of trace aromatics, and consistent compositional fingerprinting to guide critical blending decisions. Sustain2D - Jet Analyzer from PAC provides exactly that by delivering clear, accurate insight into jet fuel and SATF composition without adding operational complexity.



Maximize Your Resolving Power in a Single Run

Built to Run ASTM D8396

- Full compliance with ASTM D8396 ensures results meet the latest industry standards for SATF and jet fuel analysis.
- Pre-configured hardware and methods eliminate the need for complex setup or customization.
- Ready-to-run system shortens deployment time so labs can start generating data immediately.
- Validated performance provides confidence that every result is accurate, reproducible, and regulator-ready.

High Resolution with Low Detection

- Exceptional separation of hydrocarbon classes delivers clarity in complex SATF compositions.
- Ultra-low detection limits enable reliable identification of trace-level aromatics and other critical components.
- Stable, repeatable performance ensures consistency across multiple analyses and blending batches.

Simplified Operation

- FID (Flame Ionization Detector) offers reliable, sensitive detection for hydrocarbons with proven robustness.
- Flow modulation provides enhanced separation efficiency without adding instrument complexity.
- No cryogenics required simplifies installation and maintenance while lowering operating costs.
- User-friendly interface makes operation intuitive for both expert analysts and routine lab technicians.

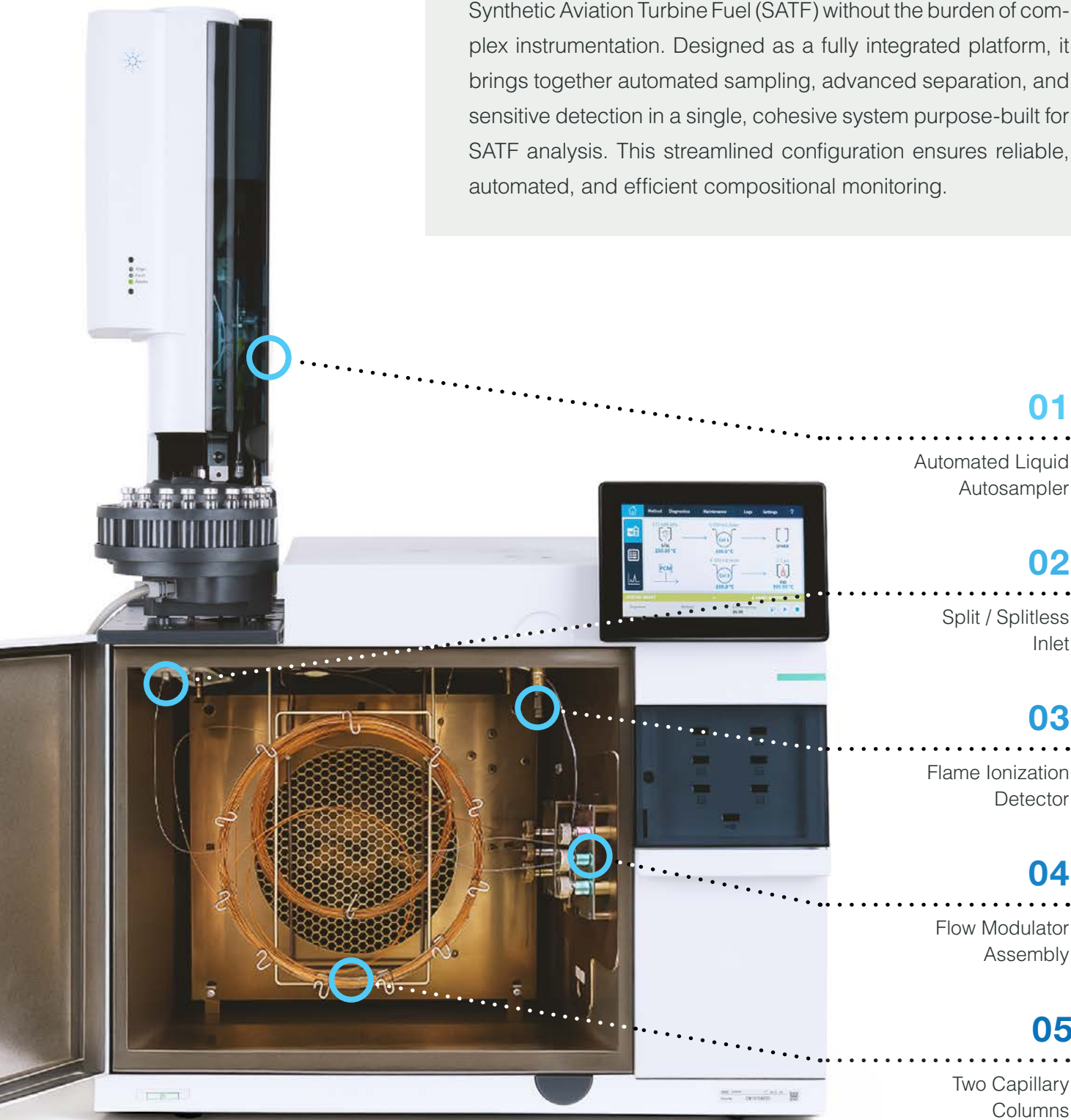
Reliable Performance for SATF and Beyond

- Designed for diverse feedstocks including HEFA, FT, ATJ, and other emerging SATF pathways.
- Robust system architecture ensures consistent results even with challenging or variable fuel blends.
- Low maintenance requirements minimize downtime and keep operations running smoothly.



Fully Integrated Solution

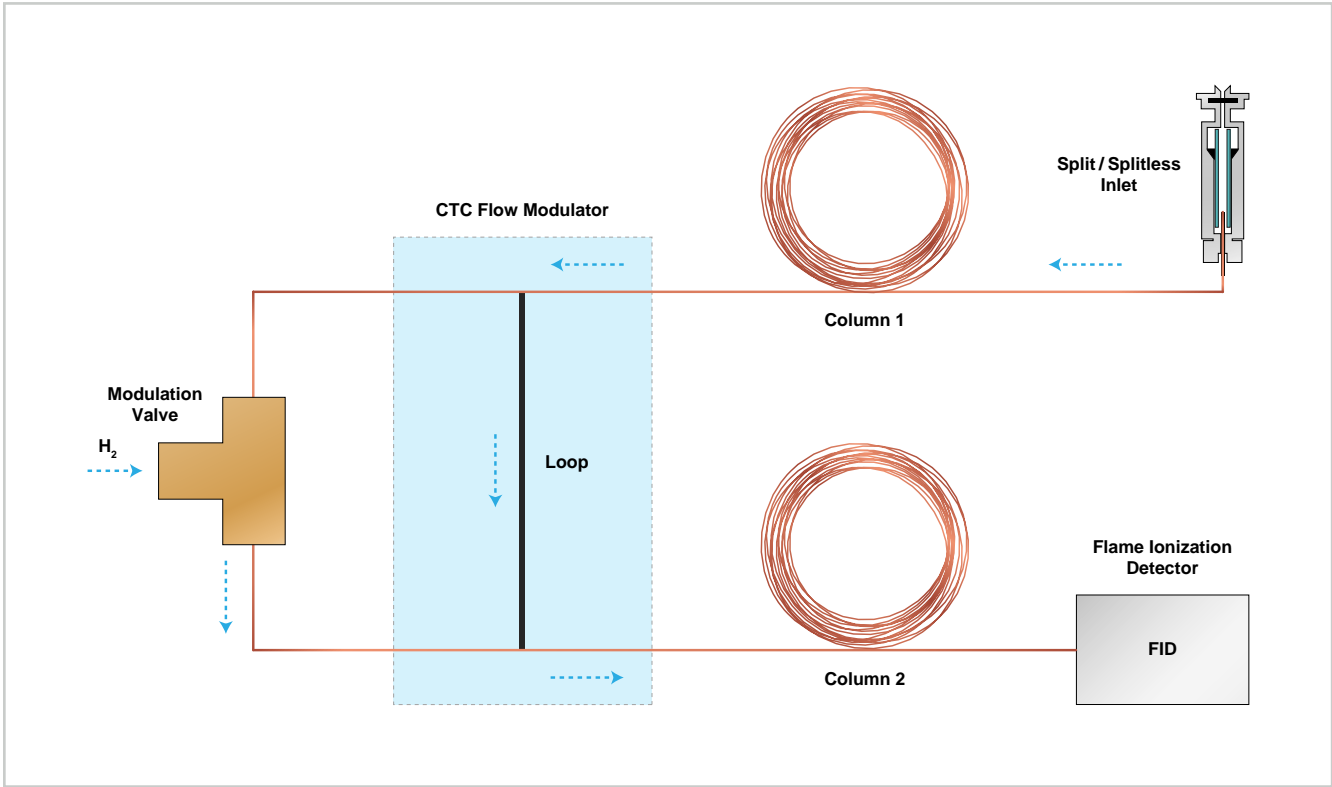
Sustain2D GCxGC analyzers deliver detailed characterization of Synthetic Aviation Turbine Fuel (SATF) without the burden of complex instrumentation. Designed as a fully integrated platform, it brings together automated sampling, advanced separation, and sensitive detection in a single, cohesive system purpose-built for SATF analysis. This streamlined configuration ensures reliable, automated, and efficient compositional monitoring.



Superior Separation Efficiency

The GCxGC process flow transforms complex fuel samples into precise, interpretable data through advanced two-dimensional separation

Carrier Gas Flow Path (Collection State)



The diagram illustrates how a sample moves through the Sustain2D system. First, the automated liquid sampler (ALS) introduces the sample into the split/splitless inlet (SPL), ensuring controlled injection. In this configuration, the first-dimension column separates compounds by polarity. The flow modulator then periodically collects and refocuses fractions before transferring them to the second-dimension column, which separates compounds by volatility. Finally, the flame ionization detector (FID) quantifies the resolved components. This integrated workflow delivers high-resolution separation, clear compound grouping, and accurate quantification essential for SATF analysis.

The process flow diagram shows how Sustain2D integrates sampling, separation, and detection into a streamlined system for reliable SATF analysis.



Proven in Jet Fuel Applications

Demonstrating Performance with a Gravimetric Blend

To validate performance for Synthetic Aviation Turbine Fuel (SATF) analysis, the Sustain2D - Jet Analyzer GC×GC system was configured in accordance with ASTM D8396. A gravimetric blend containing paraffins, naphthenes, and aromatics was used to tune and confirm system accuracy. This ensured precise transfer of analytes through both separation dimensions, a critical step in achieving reliable results across a wide variety of SATF feedstocks.

Analytical Conditions for ASTM D8396

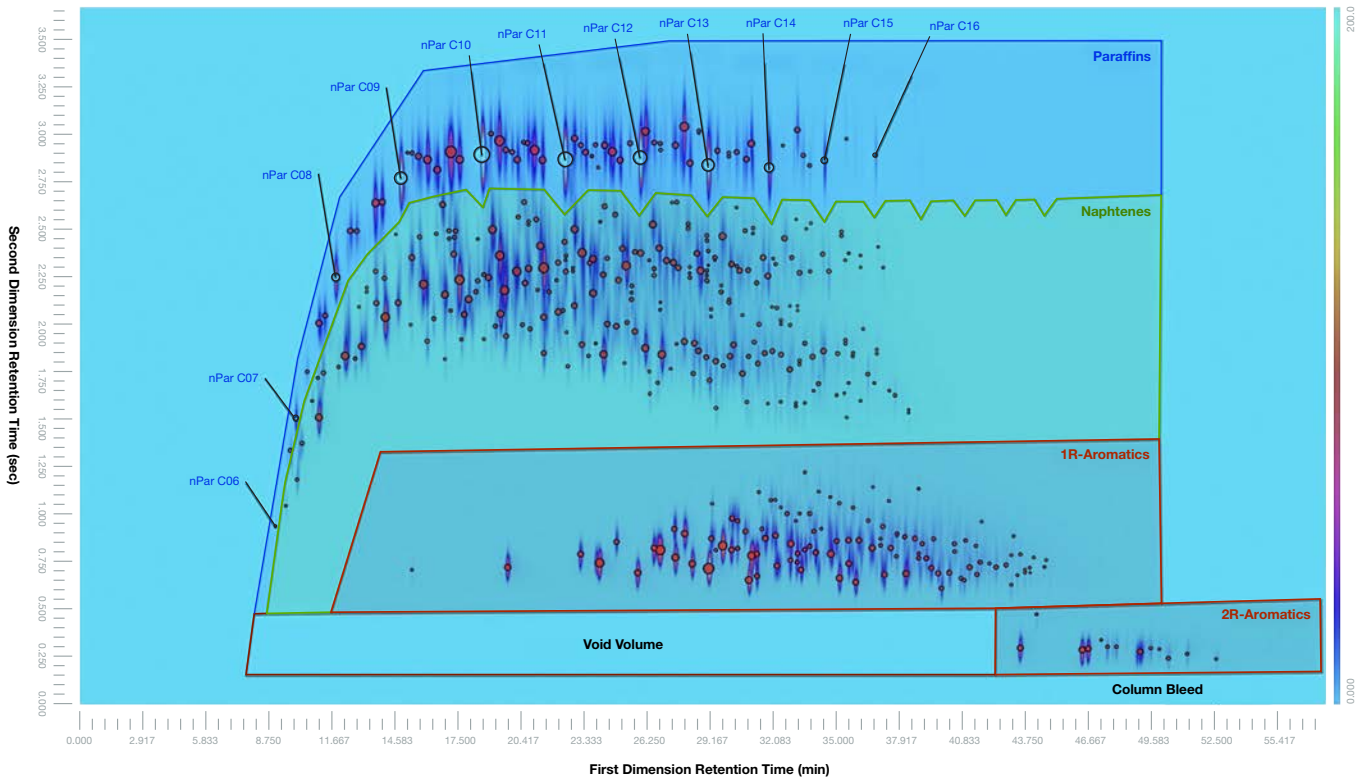
Gases	Carrier Detector (FID)	Helium
		Hydrogen
		Air
		Helium
Inlet	Temperature	325 °C
	Purge	3 mL/min
	Split Ratio	1:200
	CLFR	1 mL/min
Detector	Temperature	325 °C
	H2 Flow	35 mL/min
	Air Flow	350 mL/min
	MUP Flow	20 mL/min
Oven	Temperature	40 °C
	Equilibration Time	1 min
	Ramp	0 °C/min--> 40 °C/min--> 7.5 min
		5 °C/min--> 200 °C/min--> 0 min
		6 °C/min--> 270 °C/min--> 3 min
Flow Modulate Time	Modulation Time	3.5 sec
	Injection Time	0.1 sec

From Setup to Results

The process begins with sample injection through a split/splitless inlet, followed by two-dimensional separation across dual columns of different polarity connected by a flow modulator. After separation, compounds are detected on a flame ionization detector (FID).

During tuning, a monitor column verifies paraffins, naphthenes, and aromatics as they exit the modulator. This step optimizes modulation period and delay times, ensuring complete transfer and clear second-dimension separation. Minor oven adjustments may also be applied to prevent wrap-around and maintain clean elution patterns.

2D Plot of QC Sample



As seen in the 2D chromatogram, the Sustain2D system delivers structured, highly resolved elution patterns that clearly distinguish paraffins, naphthenes, and aromatics. This level of separation ensures complex SATF samples can be analyzed with confidence, whether reporting results as individual compounds or as grouped components normalized to 100%.

For laboratories, this means compositional analysis can shift from being an occasional specialized study to becoming part of the routine workflow. What was once a challenging process requiring advanced expertise is now a repeatable, reliable, and automated method built into the daily operation of the Sustain2D system.



Services, Support, and Training

Our individualized instrument service programs help our customers ensure maximum quality and repeatability, while complying with standards and regulatory requirements.

In addition to service programs, we also offer individual services for preventative maintenance, calibration, and relocation services. Our Service Repair Centers, located around the world, are ISO-9001 accredited. All work is performed by skilled certified service technicians.

PAC offers a wide selection of training and educational programs to support our customers throughout the range of industries that our instruments serve. Our training programs may take place in one of our PAC facilities worldwide or right at the customer’s facility. We also offer webinars of some of our key technologies online.

Technical Information

Equipment Specifications

Mainframe	Agilent 8890 Gas Chromatograph
Inlet	Split / Splitless Inlet (S/SL)
Detector	Two Flame Ionization Detectors (FID)
Oven Configuration	Temperature Programmed
Columns	Two Capillary Columns
Dimensions	19.29 in (49 cm) L x 22.83 in (58 cm) W x 20.08 in (51 cm) H
Weight	108 lbs (~49 kg)
Pneumatics	Electronic Pressure Control (EPC)
Carrier Gases	Helium
Fuel Gases	Nitrogen, Hydrogen, Air (Zero Grade)
Method Compliance	ASTM D8396-22
Communication	LAN
Power Supply	120/200/220/230/240 V, 50/60 Hz
Reference Standards	5-Piece Sample Box PNA in AVTUR, Gravimetric Blend (2 mL) 5-Piece Sample Box PNA in AVTUR, Reference Jetfuel (2 mL)
Options	Automatic Liquid Sampler (ALS), Chromatography Data Handling Software, 150-Vial Tray, 16 & 50-Vial Autoinjector



About PAC

PAC empowers global customers across various industry sectors, enhancing their efficiency through innovative solutions by designing, manufacturing, and marketing advanced lab and online analytical instruments, along with a digital platform for real-time analytics.

With decades of knowledge and expertise, our instruments consistently deliver unmatched performance and value, backed by comprehensive global support consisting of 13 sales and support offices and a network of over 140 distributors, contributing to the safe and sustainable advancement of industries worldwide.

PAC is a part of the Indicor family of companies. Indicor is a family of 15 diversified industrial solutions companies. These companies provide specialized, mission-critical products for manufacturers, and a global portfolio of proven, best-in-class companies for shareholders.



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