PSM
a Hanwha company

Innovative Clean Energy Solutions for Future Generations

501F Product and Solutions

Advanced solutions to enhance performance, reliability, and lifespan

PSM delivers proven upgrades for 501F turbines, optimizing performance, extending lifespan, reducing emissions, and improving reliability with innovative engineering solutions.

PSM 501F Products and Services

Innovative Solutions for Performance, Reliability, and Flexibility

Comprehensive 501F Solutions

PSM offers advanced upgrades, replacement components, and service solutions to enhance the performance and longevity of 501F gas turbines.

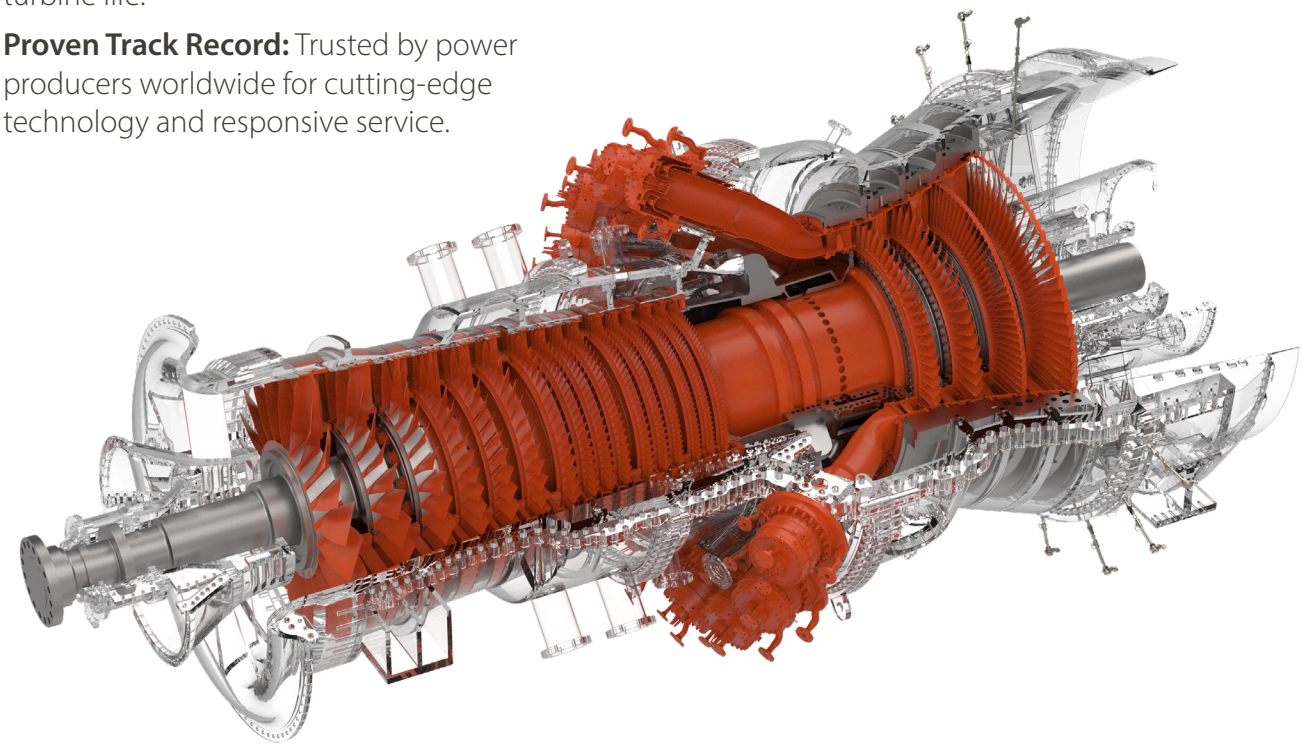
Our expertise in hot gas path and combustion systems, coupled with full rotor repair and exchange programs, ensures reliable, high-performance operation.

Why Choose PSM?

+ **Industry-Leading Engineering & Support:** Decades of expertise in delivering customized solutions for the 501F fleet.
+ **Flexible, High-Performance Solutions:** From individual components to full system upgrades, designed to maximize efficiency and extend turbine life.
+ **Proven Track Record:** Trusted by power producers worldwide for cutting-edge technology and responsive service.

Our 501F Offerings

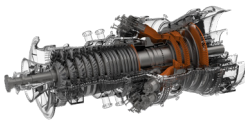
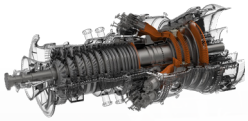
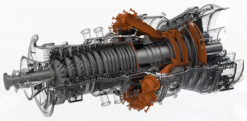
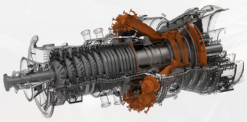
+ **Performance and Reliability Upgrades:** Advanced solutions to boost output and efficiency.
+ **GTOP, FlameSheet™, & FlexSuite:** Designed for ultimate operational flexibility.
+ **Compressor, Combustor & Turbine Flow Path Components:** Engineered for durability and efficiency.
+ **Rotor Repair, Replacement & Exchange Programs:** Extending rotor life and optimizing reliability.
+ **Emissions Reduction & Fuel Flexibility:** Supporting sustainability goals with advanced combustion technologies.
+ **24/7 Monitoring & Diagnostics:** Real-time data-driven insights for predictive maintenance.



With PSM's innovative engineering, rapid response, and extensive cross-OEM expertise, 501F operators gain a trusted partner in achieving long-term performance and reliability.

GTOP™: Gas Turbine Optimization Package

PSM's 501F upgrade packages provide flexibility, enabling users to optimize performance and maintenance schedules to their individual requirements.

		Hardware and Logic Upgrades
GTOP6 Lite 	SC: Up to +8MW & -2.5% HR (25K)	Minimal Hardware Scope Compressor Up-flow via IGV change Improved efficiency with new 16th Stage Compressor Blade Taller 4th Blade for higher flow capability & increased power (can use the FD3 4th Blade)
GTOP6 	SC: Up to +15MW & -3.4% HR (25K)	Low flow & increased durability turbine HGP hardware + GTOP6 Light
GTOP7 	SC: Up to +20MW & -3.8% HR (25K)	Additively manufactured 1st Vane with lower cooling flow + Further increased durability turbine HGP hardware + GTOP6
FlameTOP7 	SC: Up to +20MW & -3.8% HR (25K)	<40% Turndown (Lower w/ExB) FlameSheet ™ Combustor for increased turndown and sub 9ppm + GTOP7
GTOP7XT 	SC: Target >+30MW >-3.8% HR (25K)	<30% Turndown (Lower w/ExB) Lower flow additive 1st and 2nd Vanes + Leveraging technologies from GTOP4 + FlameTOP7

**Quoted benefits are for ISO day operation. Simple Cycle benefits assume from prior published 7501F capabilities*

***See PSM representative for interchangeability on all GTOP programs*

Customizing a GTOP™ Package with PSM

PSM's Gas Turbine Optimization Package (GTOP™) enhances 501F turbine performance, efficiency, and operational flexibility. Each package is tailored to meet specific plant requirements, ensuring seamless integration and maximum benefits.

Key GTOP Features:

+ **Comprehensive Plant Assessment & Unit Evaluation:** Data-driven analysis determines the optimal optimization strategy.
+ **Mode Switching Logic:** Adaptable control strategies for varying operational demands.
+ **Flexible Maintenance & Performance Modes:** Switch between 24k FH and 32k FH intervals for optimized maintenance planning.
+ **Combustor Options:** From drop-in DLN solutions to FlameSheet™ technology for ultimate fuel flexibility and emissions reduction.
+ **OEM Hardware Compatibility:** Designed for seamless integration with existing turbine components.

Leading-Edge Technology for Cost Savings

GTOP7 leverages the latest advancements in turbine technology to reduce maintenance costs while improving performance.

+ **Industry-First Modular Technology:** Enables faster, more cost-effective maintenance and upgrades.
+ **First 501F Vane Designed with Additive Manufacturing:** Advanced materials and innovative cooling designs enhance durability and efficiency.

PSM's GTOP™ solutions provide operators with state-of-the-art engineering that extends turbine life, enhances reliability, and lowers total cost of ownership.

	GTOP 6	GTOP 7
SC Output	+15 MW	+20 MW
SC Heat Rate	-3.5%	-3.8%
CC Output	+34 MW	+48 MW
SC Heat Rate	-1.3%	-1.7%

501F GTOP & Flexibility Solutions

GTOP6 – Advanced Compressor & Turbine Upgrades

+ **Compressor Upflow:** New R16 compressor blade and IGV control enhancements optimize airflow.
+ **Enhanced Durability:** Newly designed 4th-stage blade and ring segment increase robustness and longevity.
+ **Turbine Hardware Upgrades:** Improved efficiency with reduced flow and durability-enhanced turbine components.

GTOP7 – Cutting-Edge Technology & Modular Design

+ **Modular Vane Design:** Enables faster, cost-effective maintenance and replacement.
+ **Enhanced Cooling & Coating:** Optimized vanes and blades improve thermal performance and durability.

FlameSheet™ – Ultimate Fuel Flexibility & Emissions Control

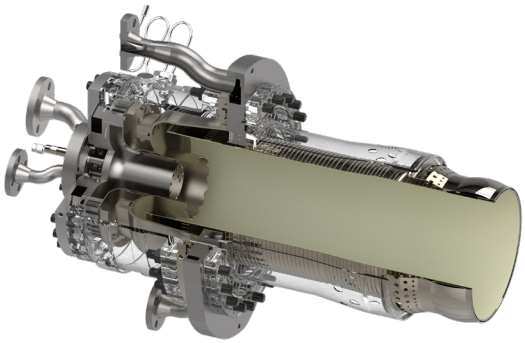
+ **<9ppm NOx and CO:** Industry-leading emissions performance.
+ **35% turndown:** Increased operational flexibility.
+ **30% Modified Wobbe Index Variation:** Enhanced fuel adaptability.
+ **32k hours / 1,250 starts Inspection Interval:** Extended maintenance cycles for lower operational costs.

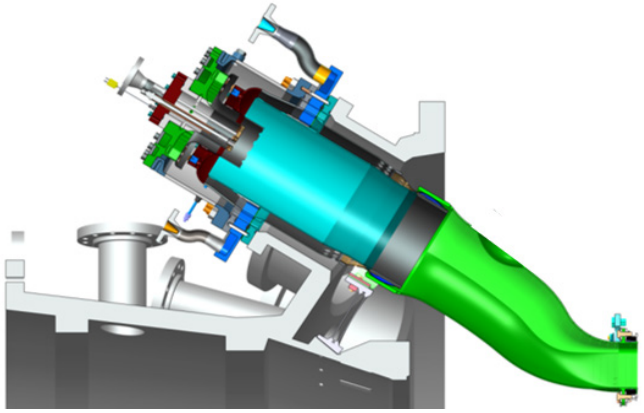
FlexSuite – Intelligent Control & Performance Optimization

+ **AutoTune with 'Self-Learning' Algorithm:** AI-driven optimization for peak efficiency.
+ **Performance Modules:** Peak+, Power+, and Flexibility modules enhance turbine responsiveness.
+ **Seamless Compatibility:** Works with most control systems for easy integration.

Superior Turndown, Fuel Flexibility, and Emissions Capability

Future-Proof your engine today! FlameSheet™ is the ultimate combustor solution to meet new operational needs. As the power generation market faces challenges from renewable energy penetration, low natural gas prices from fracking, and dynamic financial market changes, users must reevaluate their fleets to stay relevant. FlameSheet™ provides unparalleled flexibility, preparing your engine for both current operational demands and the future hydrogen economy.





CROSS SECTION VIEW. FLAMESHEET™ IS NOW AVAILABLE ON MOST ENGINE MODELS

FlameSheet™ Benefits

+ Up to a 30% increase in GT operating load range with single digit NOx and CO
+ Optional low-load HRSG protection setting
+ Superior Fuel Flexibility:
  - » 30% Modified Wobbe Index
  - » Ideally suited for alternate fuel operation, including hydrogen, ethane, and propane
    - + Up to 40-80% Hydrogen blend*
    - + Up to 40% Ethanes (C2)
    - + Up to 10% Butanes (C4-C6)
    - + Up to 20% Propane (C3)
  - » PSM is progressing towards 100% Hydrogen capability!
+ NOx as low as 5ppm
+ Peaking power at constant NOx emissions
+ Dual fuel capable
+ Inspection intervals up to 32K hours / 1,250 starts
+ Compatible with existing GT controllers and fuel skids
+ Turndown as low as 26% (even lower with Exhaust Bleed!)

FlameSheet™ = TWO Combustors in ONE

FlameSheet™ employs a simple, two-stage radially-inflow "combustor-within-a-combustor" concept, allowing staged operation at various load conditions. At high loads, both combustors are used, with the outer combustor flame structure forming an annular "sheet of flame" around the inner combustor. At low loads, the outer combustor is predominantly used. Leveraging trapped vortex stabilization aerodynamics, the outer combustor operates with excellent stability and remains sufficiently hot at very low loads to consume CO (which typically limits low-load operation).the outer combustor operates with excellent stability and remains sufficiently hot at very low loads to consume CO (CO typically limits low load operation).

Digital Products

Maximizing Plant Performance

PSM's Digital Technology Portfolio maximizes your plant's performance before, during, or after large equipment upgrades. Often, combining multiple engineered systems creates overlapping redundancy, which, when fully understood, provides significant optimization potential. Over the last decade, PSM has combined our domain expertise in GT technology, combustion system design, engine upgrades, engine operation from our M&D Center, and controls logic experience with balance of plant operations and advanced controls methods to create innovative optimization tools. Using proprietary and patented controls blocks, we offer multiple optimization features tailored to your individual needs.

FlexSuite and AutoTune

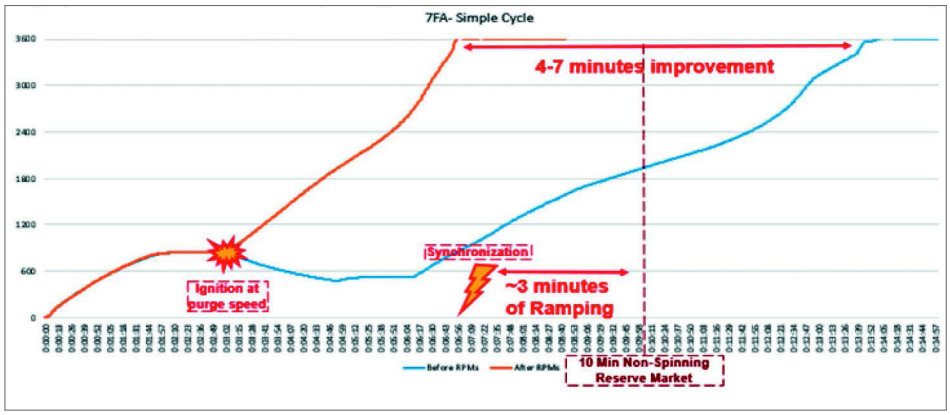
A portfolio of applications for your existing controller, FlexSuite from PSM, provides digital optimization for your power plant operations. Whether you seek operational reliability improvements or increased operational flexibility, there are multiple optimization features offered to suit your individual needs.

FlexSuite Building Blocks

+ Combustion Optimization
+ Start-up / Shut-down Optimization
+ Enlarged Load Range
+ Efficiency and Lifetime
+ Fuel Flexibility
+ Grid Support
+ Service Flexibility

Start-Up Optimization

FlexStart & FlexRamp: Increase Reliability and Availability through control logic improvements and adaptations that allow your GT's to better meet your performance needs. No matter if you are in a 10 minute start-up market or auxiliary services, being able to start faster and subsequently ramp fast both before and after heat soak can provide significant monetary value.



Example 7F rotor RPM with FlexStart controls logic optimization, gets SCGT to grid synchronization 7 minutes faster than originally commissioned allowing plant to operate in 10 minute spinning reserve market

AutoTune

Intelligent GT combustion optimization for emissions and combustion dynamics while maximizing operational range and fuel variation. Utilize in conjunction with FlexSuite, FlameSheet™, and GTOP™ to maximize the optimization potential.

System Features

+ AutoTune is an expert advisory system that provides extra level of intelligent protection to your existing controller
+ External to control system
+ HMI screen seamlessly integrated
+ Patented learning algorithms eliminate the need for seasonal tunes and provide significant system enhancement.

Tuning Optimization

+ **Dynamics:** Improved hardware life and Lean Blow Out mitigation
+ **Emissions:** Consistent emissions even with atmospheric/climate/seasonal changes at varying load points
+ **Learning:** Intelligent learning of known operational points reduces the need for tuning and minimizes errors

Transient tuning: Adapts to cycling of units and responds to dynamic changes.

Trip Avoidance: Provides ultra-fast reaction if the combustor is flaming out to prevent a trip.

AutoTune Learns

Patented learning algorithms capture information from successful and unsuccessful tuning events. Over time, AutoTune learns and significantly reduces the need for tuning under similar operating conditions.

FlexSuite – Flexibility Building Blocks

PSM's FlexSuite offers additional controller modules compatible with most control systems and designed to optimize your plant's performance.

Extended Turndown

+ Dynamic optimization of unit minimum load
+ AutoTune monitors emissions and combustion dynamics to safely meet load target or hold at lowest safe point of operation
+ Integrated with both manual load control or AGC drive load targets
+ Learns over time by saving ambient condition profiles, allowing for quicker load ramp when revisiting safe operating points

Operational Flexibility

With PSM's patented algorithms, it is possible to maximize the GT output according to climate conditions and actual system performance. For example, if you want to maximize seasonal peak power potential, Peak+ continuously seeks to maximize the load range while maintaining emissions and dynamics. Three optional modes are available:

+ **Power+:** Current firing temperature range with no impact on hardware life
+ **Peak+:** Option for increased peak firing mode to achieve greater improvements, with some hardware lifetime debit
+ **Turndown:** - minimizing low load point by maintaining output just above premix transfer

While running on AGC or remote dispatch: Peak+/Power+, Turndown & Transient Tuning all active during Automated Generation Control and do not require stable load conditions before optimizing.

501F Drop-In Combustion Systems

PSM's Drop-In Combustor showcases advanced technology that extends turndown capability and inspection intervals beyond competing designs. Fully compatible with OEM equipment at both component and system levels, this system integrates PSM's Transition Piece and Pilot Nozzle, demonstrating over a decade of operational success. Recent additions, including Support Housings and Baskets, further enhance reliability. The complete system has eliminated standalone combustion inspections, operating continuously through a full Hot Gas Path interval.

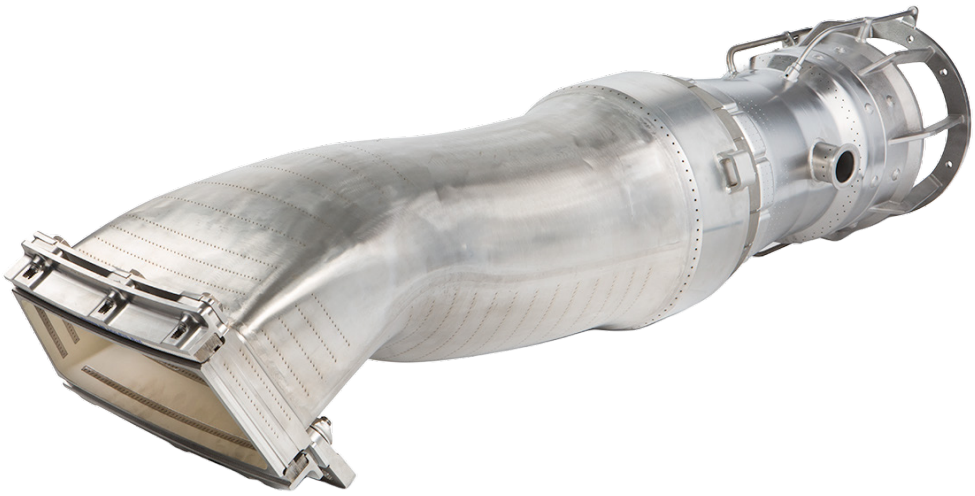
Key Components & Enhancements

Basket

+ Upgraded materials and effusion cooling for improved thermal performance
+ Enhanced pilot cone cooling for increased durability
+ Decoupled mechanical attachment reduces combustion frequency impact
+ Proven performance since 2010
+ Compatible with FC, FD1, FD2, and FD3 configurations
+ Improved turndown capability for greater flexibility

Transitions

+ Upgraded solid-wall material for enhanced durability
+ Modified body shape improves structural integrity
+ Effusion cooling with full thermal barrier coating (TBC) extends lifespan
+ Optimized thermally-free mount to Stage 1 vane
+ Proven reliability since 2003 in real-world applications



Support Housings

+ Mitigated fuel manifold leak risk for increased reliability
+ Reduced rocket tip wear when paired with PSM Baskets
+ Controlled fuel flow variation improves efficiency
+ Available in Gas-Only and Dual-Fuel configurations
+ Options for Heated and Unheated systems

Pilot Nozzles

+ Single-body torso design reduces dynamic response issues
+ Coated heat shield enhances durability and longevity
+ Dual-Fuel configurations available for flexible operation
+ Field-proven since 2003, ensuring reliable performance

With over 20 years of expertise in combustion technology, PSM's Drop-In Combustion Systems deliver increased reliability, extended maintenance intervals, and enhanced operational flexibility, providing a superior alternative to OEM designs.

501Hot Gas Path: Blades, Vanes, and Ring Segments

PSM delivers a comprehensive platform approach to 501F hot gas path components, incorporating advanced materials, optimized cooling designs, and cutting-edge manufacturing to enhance durability, efficiency, and repairability.

Blades

PSM's 501F turbine blades feature upgraded materials and coatings, specifically designed for enhanced durability, wear resistance, and improved repairability across all rows.

Row 1

+ High-efficiency internal cooling for improved thermal management
+ Active platform design for enhanced structural integrity
+ Trailing & leading-edge platform undercut design with a cast-in tip cap for durability

Row 2

+ Optimized trailing-edge undercut design with a modified tip cap
+ High-efficiency internal cooling for heat resistance
+ Under-platform debris pocket to minimize particle accumulation

Row 3

+ Modified tip shroud design reduces weight and addresses OEM curling issues
+ Optimized radial cooling for enhanced heat dissipation
+ Welded hardface at the shroud Z-notch for added durability

Row 4

+ Welded hardface at the shroud Z-notch for extended wear resistance
+ HVOF external coating for improved thermal and corrosion resistance

Vanes

PSM's vanes are designed for enhanced cooling, durability, and extended service life, utilizing additive manufacturing and advanced materials to eliminate common failure modes.

Row 1

+ GTOP7 additive-manufactured modular vane with a replaceable insert for cost-effective maintenance
+ Optimized cooling design enhances durability and longevity
+ Redesigned to eliminate unscheduled outages caused by ID welded pan failures

Row 2

+ Material upgrade improves creep resistance, repairability, and weldability
+ Enhanced platform design eliminates cracking issues
+ Minimized hot gas ingestion for improved component longevity
+ Optimized cooling flow enhances platform durability
+ Bolted doublet design reduces stress for greater reliability

Row 3

+ Material change enhances creep resistance, repairability, and weldability
+ Improved creep properties reduce the risk of rotor rub
+ Enhanced TMF behavior for better cyclic performance
+ Typical 50,000-hour operation without repair, extending service intervals

Ring Segments

PSM's ring segments incorporate advanced cooling, material upgrades, and sealing improvements to enhance turbine efficiency and reliability.

Row 1

+ Improved edge cooling for better thermal management
+ Enhanced intersegment purge to reduce hot gas leakage

Row 2

+ Significant material upgrade to minimize distortion and extend component life
+ Optimized intersegment gap improves sealing and efficiency
+ Integrated seal retention feature enhances segment stability

Rows 3 & 4

+ Brazed honeycomb material for improved durability and sealing performance

With decades of engineering expertise and a commitment to innovation, PSM's 501F hot gas path solutions provide superior durability, reduced maintenance costs, and enhanced turbine performance, making them a reliable alternative to OEM components.

Additive Manufacturing

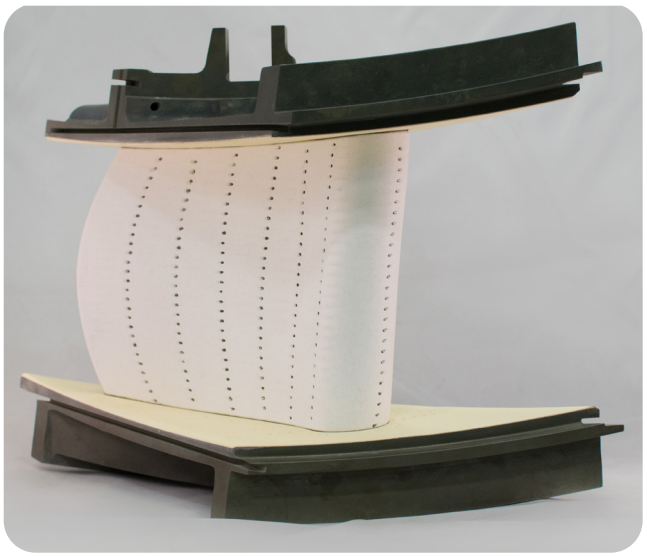
What is Additive Manufacturing?

Additive Manufacturing (AM), commonly known as 3D printing, constructs components layer by layer using advanced materials. Various AM processes exist, including Material Extrusion for polymers, Laser Powder Bed Fusion (LPBF), and Directed Energy Deposition (DED) for metals. PSM utilizes AM technology to enhance performance, accelerate innovation, and reduce costs in gas turbine manufacturing.

PSM's Additive Manufacturing Applications:

+ Modular combustion components: LPBF-produced swirlers and cartridges for improved efficiency.
+ Rapid prototyping: LPBF test parts and miniaturized polymer mockups for accelerated R&D and engineering studies.
+ DED laser cladding: Tip cap restoration on advanced buckets and blades for enhanced durability.
+ Hot Gas Path part replacements: LPBF components with advanced cooling and maintenance techniques.

FIRST DEMONSTRATION OF GTOP7 ROW VANE 1



GTOP7 with FlameSheet™: An Additive Manufacturing Success Story

PSM's GTOP7 and FlameSheet™ technologies exemplify the pinnacle of 501F flexibility and efficiency, made possible through innovative AM techniques.

Revolutionary Cooling Capabilities

In 2012, PSM initiated an intensive R&D program to explore AM technology for advanced cooling solutions. To achieve the increased firing temperatures necessary for higher output in next-generation GTOP programs, engineers developed a completely redesigned Row 1 vane and Row 1 and 2 blades.

Traditional manufacturing methods couldn't provide the necessary cooling in high-temperature environments. AM unlocked new possibilities, enabling:

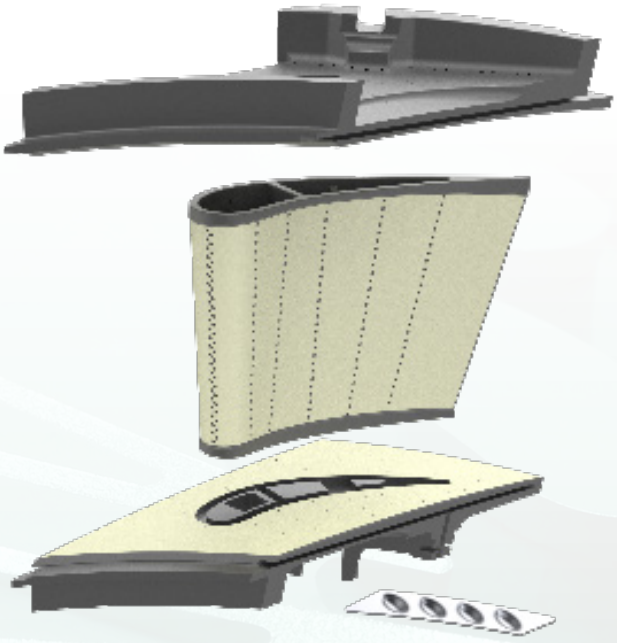
+ **Optimized cooling channels:** Uniquely manufacturable only through advanced AM techniques.
+ **Proprietary AM alloy powder:** Engineered specifically for stationary hot section components.
+ **Cost-effective solutions:** A geometrically redesigned Row 1 vane, integrating AM technology with standard manufacturing for easy maintenance and lower life cycle costs.

Accelerating Development & Reducing Lead Times

AM transformed the manufacturing process of the FlameSheet™ combustor by enabling:

+ **Enhanced fuel cartridge design:** Improved fuel and air mixing for optimized combustion.
+ **Faster development cycles:** From CAD model to prototype to engine deployment in under a year.
+ **Superior performance at lower costs:** Significantly reduced production lead times while maintaining cost competitiveness.

By harnessing the power of Additive Manufacturing, PSM has broken traditional design barriers, delivering higher efficiency, greater durability, and faster innovation for 501F gas turbines.Manufactured from 310 SS alloy.



GTOP7 MODULAR ADDITIVE VANE

Exhaust Cylinder & Manifold Solutions

PSM's exhaust system upgrades enhance durability, reliability, and maintainability, addressing common industry challenges through advanced materials and design improvements.

Exhaust Cylinder Enhancements

+ Thermally free cylinder design: Reduces thermal stress and extends component life
+ Baffle plate elimination: Enhances exhaust flow and minimizes failure points
+ Low-stress strut shield design: Improves durability under high-temperature conditions
+ High-strength strut material: Increases structural integrity for long-term reliability
+ Mechanically robust liners: Withstand extreme operating conditions
+ Enhanced liner material: Improves weldability for easier maintenance and repairs
+ New exhaust static seal design: Provides better sealing performance and reduces leakage risks
+ Improved aft flange design: Ensures seamless integration with OEM manifold

Exhaust Manifold Upgrades

+ Full compatibility with PSM's exhaust cylinder: Ensures smooth integration and enhanced performance
+ Flange thermal fight elimination: Reduces stress and improves long-term component stability

  Tapered flange design: Enhances fitment and minimizes stress concentrations

  Low-profile ribs with reduced count: Improves thermal expansion capabilities and reduces mechanical wear

  Enhanced manway design: Simplifies access for inspection and maintenance

  Thicker OD liner and manways: Increases component durability and operational lifespan
+ Improved tailcone design: Optimizes exhaust flow and efficiency

PSM's exhaust solutions deliver longer service life, improved maintainability, and superior performance, ensuring optimal turbine operation with reduced downtime.

9F Compressor Reliability Solutions

PSM's compressor upgrades and reliability solutions address common OEM fleet diaphragm issues, enhancing durability, efficiency, and long-term performance.

Common OEM Compressor Challenges:

Diaphragm Excitation & Case Wear

+ Original OEM design risks premature failure, often failing to reach the expected Hot Gas Path (HGP) interval
+ Case-modified geometry improves durability but may still experience early removal events

ID Seal Box Interaction with Rotor

+ Excessive wear can cause sealing inefficiencies, impacting compressor performance

Anti-Rotation Feature Failure

+ Overload on static hardware compromises system stability, potentially leading to failures
+ Complete offering for flared and unflared compressor flowpaths available

Compressor Diaphragm Solutions

PSM offers full FD2/FD3 compressor diaphragm solutions with significant durability enhancements, requiring no case modifications:

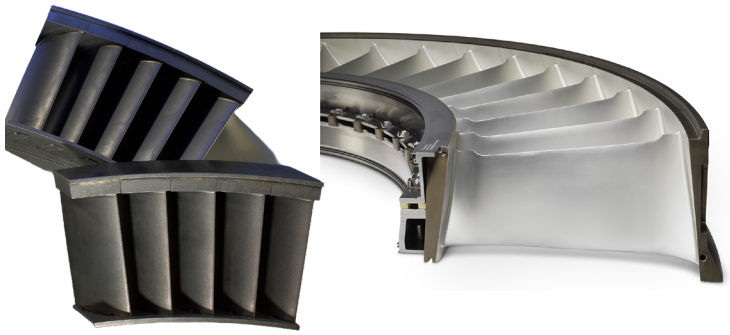
+ **Stages 1–8:** Fully forged design eliminates welding, enhancing structural integrity and longevity
+ **Stages 9–16:** Patented airfoil geometry with individually forged blades and full-penetration laser welding for superior strength
+ **Advanced wear coatings:** Applied to case interaction surfaces, extending both case and airfoil lifespan

Compressor Blade Solutions

PSM provides a complete range of OEM-equivalent FD2/FD3 compressor blades, ensuring high-quality performance and seamless integration:

+ Manufactured or assessed in PSM's dedicated compressor cell in Jupiter, FL
+ Engineered for durability in high-stress operating conditions

PSM's compressor reliability solutions offer operators enhanced component life, reduced maintenance costs, and improved operational stability, ensuring long-term fleet reliability.

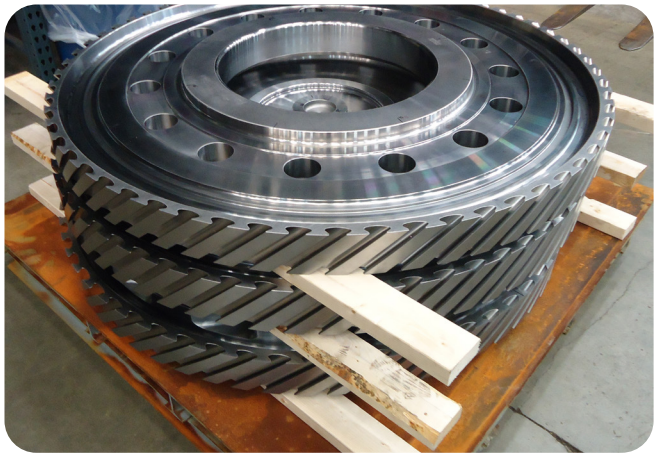


Rotor Management Solutions

Capitalizing on a portfolio of rotor and blading design upgrades, along with full 3D steady-state and transient analysis models, PSM offers a comprehensive exchange rotor service. With a PSM LTE rotor, you can minimize downtime and optimize your capital investment.

Capabilities

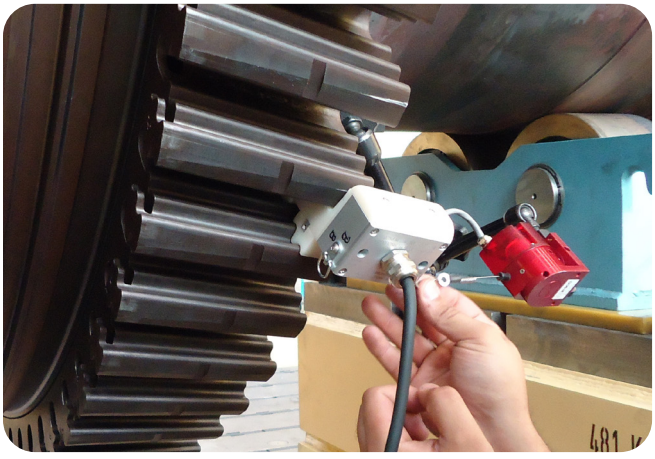
+ Unstack and deblade
+ Reblade and tip grind new blades
+ R0 retention plug modification
+ Compressor clocking optimization
+ Patch ring repairs
+ Complete rotor structural analysis to support repairs
+ Proprietary design flared and unflared compressor blading with reliability improvements
+ Seed rotor to support rotor exchange program



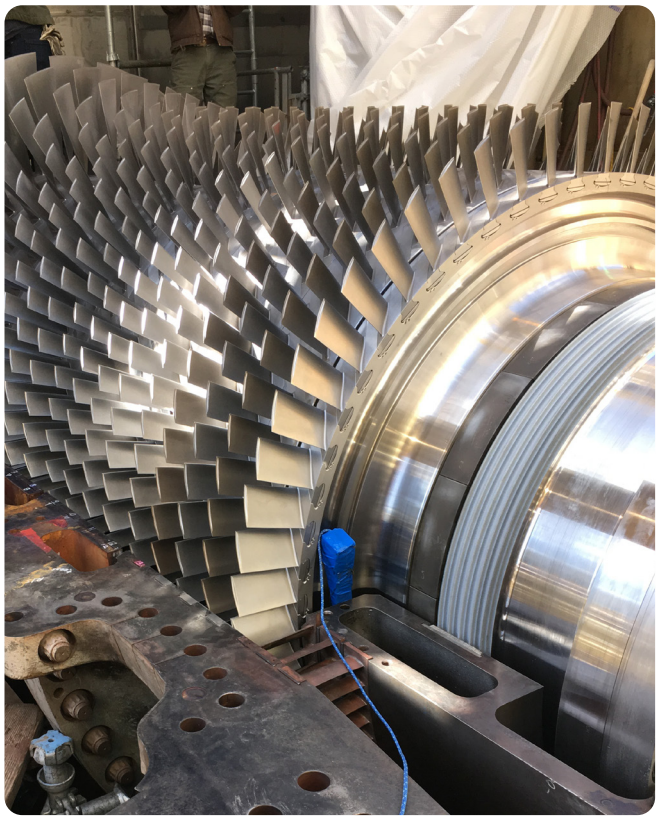
SEED ROTOR DISASSEMBLY

PSM Rotor Exchange

+ Seed rotor supports rotor exchange program
+ In-situ blend, polish, and peen of first turbine disk cooling slot
+ Additional life-enhancing solutions available upon full destack



ROTOR BEING TESTED



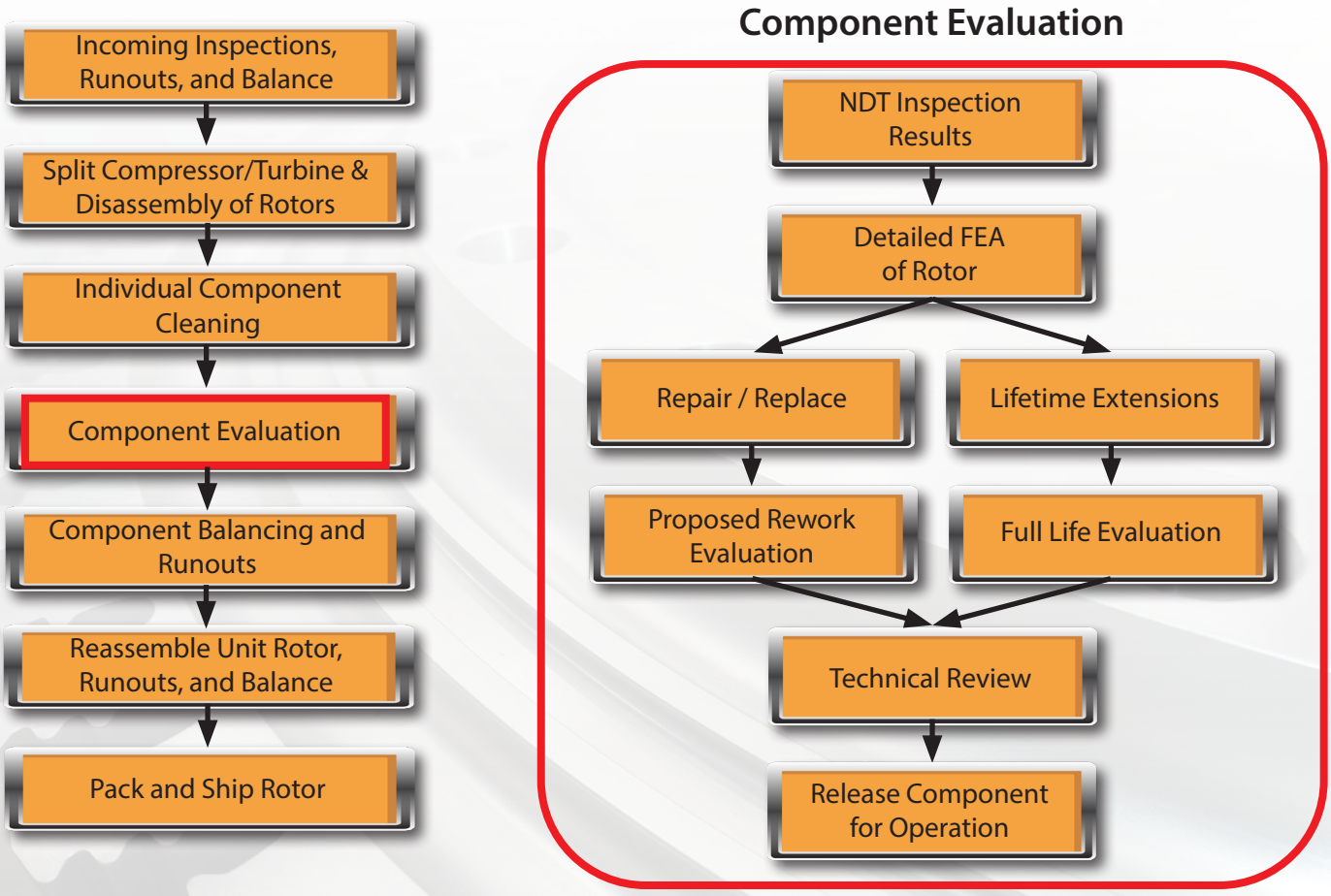
SEED ROTOR INSTALLED AFTER COMPRESSOR

Rotor Lifetime Extension (LTE)

PSM's Rotor LTE program extends the useful lifetime of your rotor. By harnessing advancements in computing power, material properties, fracture mechanics methodologies, and inspection techniques, we can now assess the potential to operate rotors beyond their original published limits. Rotor LTE is facilitated by:

+ Advanced non-destructive inspection techniques to detect surface and volume flaws
+ Comprehensive rotor material characterization
+ Full 3D Finite Element Analysis (FEA) models for thermal and structural analysis
+ Integration of inspection results and operational history into the FEA model

Any identified problematic flaws are thoroughly analyzed, and a detailed report predicting the remaining rotor capability is generated. This empowers owners to make informed decisions about their rotor assets. Optional rotor modifications, designed to extend rotor lifetime in known life-limiting locations, can also be applied.



Long Term Agreements

Summary of Offerings

As a leading parts provider, PSM offers comprehensive and flexible Long Term Agreements for 7F, 501F, 6B, and 7E models, aimed at reducing lifecycle costs for the end user. Our engineered part designs increase component life and extend program intervals, eliminating inspections and providing significant cost savings over the contract's life. Additionally, our improvements to OEM designs and reconditioning processes reduce the fallout of hot gas parts. PSM has also assembled a highly skilled and experienced field service team capable of industry-leading outage performance.

Flexible Agreements — to fit the customer needs

Types of PSM Service Agreement Offerings			
Included Product Offereings	**Long Term Agreement (LTA)**	**Long Term Maintenance Agreement (LTMA)**	**Frame Agreement**
Parts Supply	✓	✓	✓
Reconditioning	✓	✓	✓
Field Services	✓	✓	Optional
Monitoring & Diagnostics (Remote Monitoring)	✓	Optional	Optional
Contract Manager	✓	Optional	Optional

PSM has developed a flexible concept for Long Term Agreements tailored to meet dynamic market conditions and customer needs. Our agreements aim to offer competitive pricing and leverage the full portfolio of PSM offerings. They can include not only gas turbines but also generators, steam turbines, and auxiliary systems. The focus is on optimizing maintenance budgets, guaranteeing part life, minimal parts fallout, coverage during unscheduled inspections, inventory control, and proactive contract management for total coverage.

In summary, our diverse agreement offerings are designed to optimize your maintenance budget. They provide competitive guarantees on parts life, minimal parts fallout, comprehensive coverage during unscheduled inspections, effective inventory control, and proactive contract management, all to ensure complete coverage.

Scope of Supply — based on the customer requirements

Customers define the scope of Long Term Agreements, which can range from full service to specific pricing agreements. Services offered by PSM include:

+ Parts Supply
+ Reconditioning
+ Field Services, including craft labor
+ Monitoring & Diagnostics (e.g., Remote Monitoring)
+ Contract Management
+ Inventory Management
+ Parts Tracking
+ Engineering Assessments
+ System Technical Support
+ Emergency Response

Service Capabilities incuding Monitoring & Diagnostics

PSM services a diverse portfolio of GT components, control and combustion system platforms

+ Reliable coverage from basic support through complex root cause analysis.
+ Service Engineering extends beyond traditional support to incorporate best practices from all platforms & systems.
+ Strong processes & infrastructure position PSM to further grow capabilities.

Engineering Assessment

+ A dedicated team supports our Field Service, Project Management, Sales & Tendering, R&D, Fleet Management, Global Execution Centers, and Customers.
+ Over 400 events per typical outage season evaluated and answered.

Team access to all parts of the PSM organization ensures quick event disposition.

Tuning and Commissioning

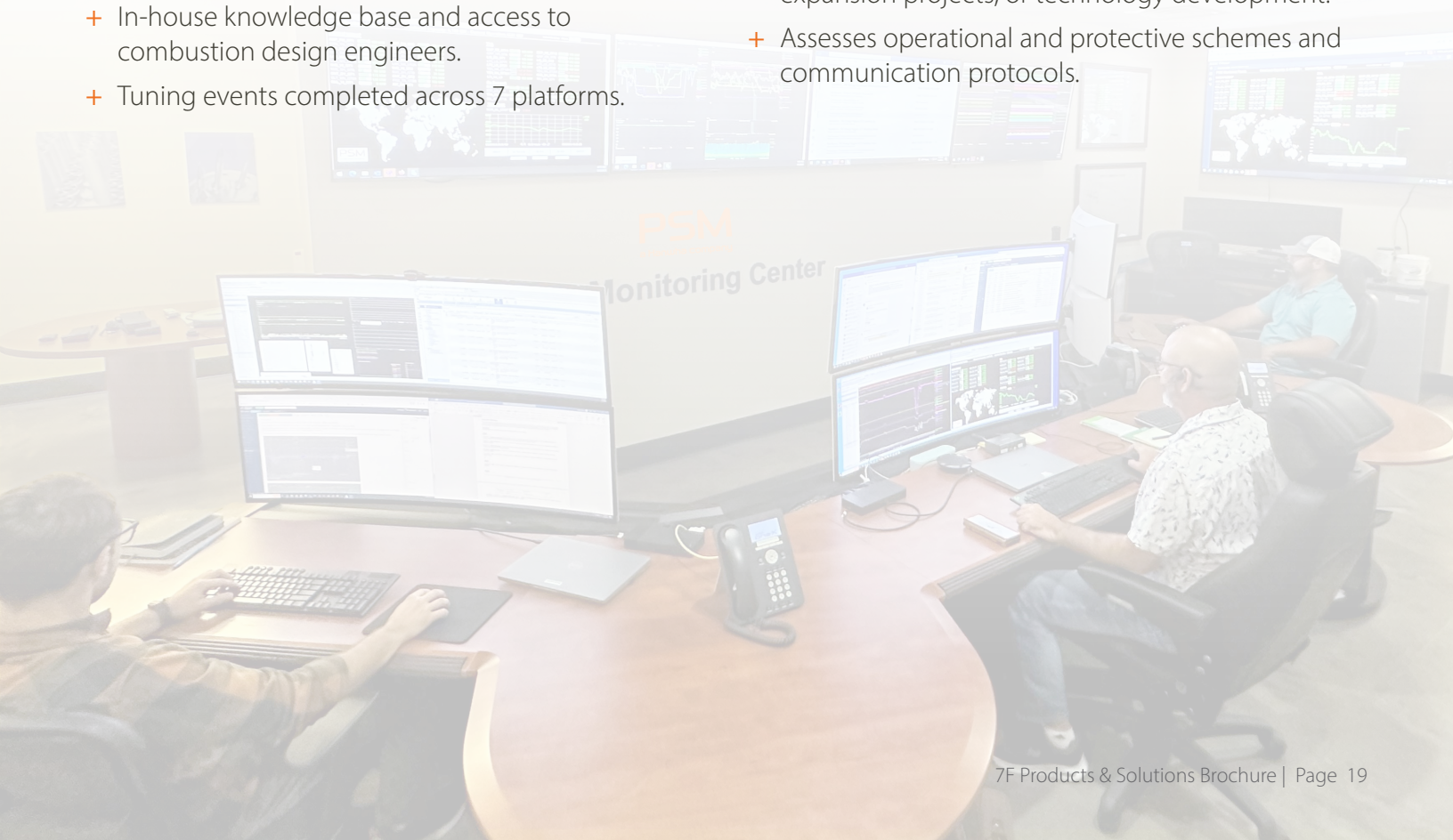
+ Over 200 tunes per year across a wide variety of combustion technology and control systems
+ Strong expertise in both OEM & PSM Combustion systems.
+ In-house knowledge base and access to combustion design engineers.
+ Tuning events completed across 7 platforms.

Monitoring and Diagnostics

+ Over 50 units and 10 GW monitored.
+ Global cloud-based infrastructure with redundancy.
+ 24/7 Monitoring.
+ Monthly Operational Assessment Reports (OAR's) included monitoring of customer-selected parameters.

Controls Design and Development

+ Controls-related services across seven different platforms.
+ Support customers and PSM technology initiatives.
+ Designed to support controls replacement, expansion projects, or technology development.
+ Assesses operational and protective schemes and communication protocols.

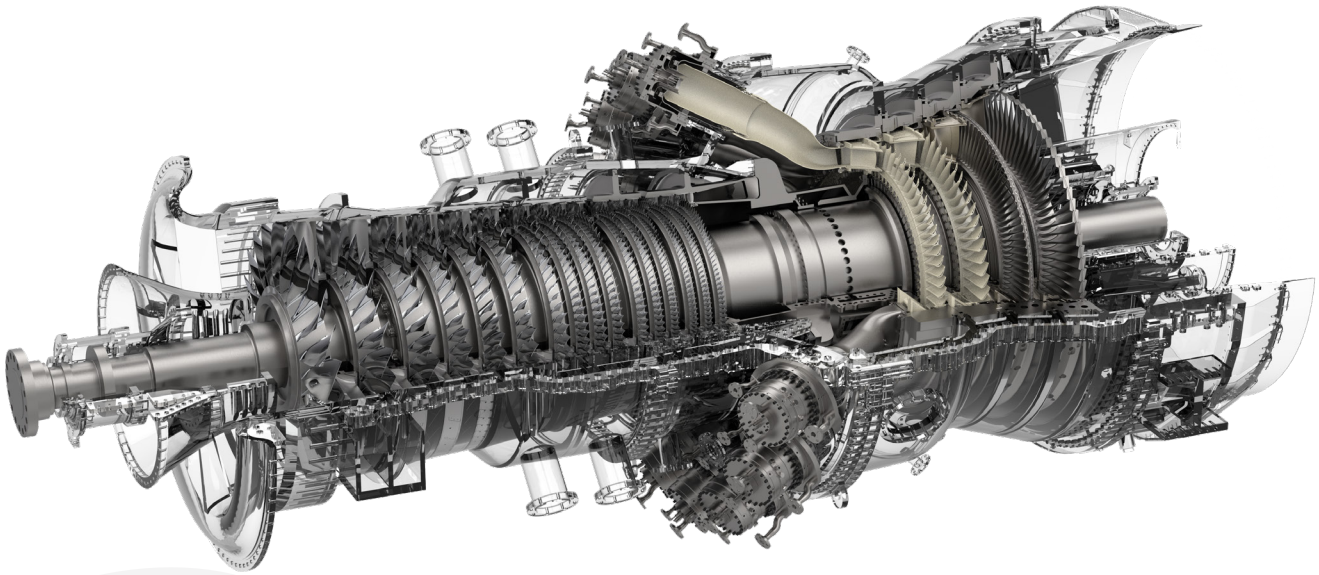


PSM - A Hanwha Company

The growing interest in the hydrogen economy is driven by the need to address climate change and transition to sustainable energy sources. However, challenges remain, including high production and storage costs, and extensive infrastructure requirements for distribution and transportation.

As a Hanwha subsidiary, PSM is uniquely positioned to leverage the expertise and resources of the Hanwha family to accelerate hydrogen development and adoption as a clean energy source. Hanwha's global presence and diverse business interests in areas like solar energy and defense provide PSM access to a wide array of technologies, markets, and partnerships.

Collaboration with Hanwha Q CELLS, a leader in large-scale solar projects, enables PSM to integrate hydrogen production with solar energy systems, fostering more sustainable and efficient energy solutions.



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