



“90% of GTUS attendees learned job-related information and would recommend the conference to their colleagues.”

– GTUS08 Attendee Survey



FINAL PROGRAM

GTUS **GAS TURBINE USERS SYMPOSIUM**

Co-located with Texas A&M Turbomachinery Symposium

www.asmeconferences.org/gtus2010/

OCTOBER 4-7, 2010
GEORGE R. BROWN CONVENTION CENTER
HOUSTON, TEXAS USA



ASME INTERNATIONAL GAS TURBINE INSTITUTE

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39th Turbomachinery Symposium



ASME INTERNATIONAL GAS TURBINE INSTITUTE is pleased to, once again, co-locate GTUS with the Turbomachinery Symposium. The Symposium is an outstanding value for users concerned with maintenance, performance, troubleshooting, operation, and purchase of rotating equipment.

Some highlights of the 39th Turbomachinery Symposium include:

- Welcome Address - Tuesday, October, 5 from 8:00 - 8:35 a.m.
(Level THREE, General Assembly Theater C)
- Technical Sessions - Lectures, tutorials, discussion groups, and case studies that best meet attendee's personal and professional needs and interests.
- Exhibit Hall – Featuring products from many key companies in the industry.

All GTUS Attendees have access to the 39th Turbomachinery Symposium Exhibit Hall. Please visit the Exhibit Hall during the following days and hours:

Tuesday, October 5th: 12:00 - 2:00 p.m. and 3:30 – 7:00 p.m.

Wednesday, October 6th: 12:00 - 2:00 p.m. and 3:30 – 7:00 p.m.

Thursday, October 7th: 9:30 a.m. – 12:00 p.m.

GTUS Attendees can upgrade to the 39th Turbomachinery Symposium for only \$300.

This upgrade includes access to all Turbomachinery Symposium sessions and proceedings.

A close-up photograph of a gas turbine bucket, showing its complex, curved shape and the small holes along its inner surface. The background is a soft, blurred gradient of blue and green.

Cutting-edge blades to trim your costs.
It's in our power.™

Advanced designs. High-temperature alloys. Advanced coatings. Our industrial gas turbine buckets, combustion parts and nozzles run cooler and longer. Our aerospace-derived technologies dramatically raise the bar on reliability while lowering life cycle costs. And our expert global service and support give you yet another edge. Learn more at www.pw.utc.com. ***Come visit us at booth #1439.***

Power Systems

Pratt & Whitney
A United Technologies Company

from the program chair

I am pleased to welcome all of you to Houston for the 2010 edition of the ASME Gas Turbine Users Symposium (GTUS).

This year's symposium offers everyone an opportunity to learn about industry best practices, new technology and recent developments. In our program of tutorials, panels and roundtables sessions you'll find an ideal setting for the exchange of information with other industry practitioners.

True to our core vision, we have put together a symposium that focuses on the needs of gas turbine users. Some of the new additions to this year's program include Inlet Filtration, Heat Recovery Steam Generators (HRSG) and Long Term Service Agreements (LTSA).

A dedicated group of session organizers, ASME staff members, and the presenters you'll meet during the symposium have spent thousands of hours creating this high quality program. Our common goal is to provide practical information on a variety of challenges facing our environment, while also helping you meet and interact with other users and experts in the community. We hope that you leave our symposium with a few new ideas on how to improve your operation, and a number of new contacts who can assist you in the future.

Your feedback is critical to the continued success and growth of the program. As you attend sessions, we encourage you to share your opinions with session leaders. If you'd like to be part of the committee that creates this symposium, we welcome you to attend the GTUS 2011 Planning Meeting on Wednesday afternoon.

In addition to seeing you in the sessions, we hope you will join us at the networking dinner and GE shop tour on Monday evening.

Best Regards,

Thom Eldridge, P.Eng,

2010 GTUS Chair
Senior Rotating Equipment Engineer
Currently Seconded to QatarGas 3&4
Shell Projects and Technology | Houston, Texas



Thom Eldridge, P.Eng.
2010 GTUS CHAIR



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COMBINED CYCLE Journal

 **GAS TURBO TECHNOLOGY**
The Specialist in Information and Analytics Edition

2010 Gas Turbine Users Symposium...

ROOM		342D	
TRACK		Education Sessions	
Date	Time		
Tuesday October 5, 2010	08:30 - 10:00	Introduction to Gas Turbines (Part 1)	
	10:30 - 12:00	Introduction to Gas Turbines (Part 2)	
	14:00 - 15:30	Introduction to Gas Turbines (Part 3)	
Wednesday October 6, 2010	08:30 - 10:00	Introduction to Coatings (Part 1)	
	10:30 - 12:00	Introduction to Coatings (Part 2)	
	14:00 - 15:30	Gas Turbine Discussion Group with TMS	

342E

Operations & Maintenance

Hot Section Life Extension Strategies*

Gas Turbine Materials for the Non-Metallurgist

Gas Turbine Upgrades

Gas Turbine Replacement Parts

Perspective on CSA and LTSA

Root Cause Failure Analysis

352A

Gas Turbine Advances

Inlet Conditioning / Air Treatment

Aeroderivatives and Light Industrial Engines

Gas Turbine Rotor Life Extension Issues versus OEM Directives

Gas Turbine Controls: Replacement / Upgrades

Gas Turbine Controls: Remote Monitoring Diagnostics

Heat Recovery Steam Generator (HRSG)

*Features papers published at ASME Turbo Expo

session details...

TUESDAY, OCTOBER 5TH | FULL DAY, THREE-PART TUTORIAL | ROOM 342D

Introduction to Gas Turbines

Instructors: Andrew Bromley, Turbotect (USA), Inc.

Richard Sessions, BTEC Turbines

Brian Delamer, Del Energy Services

Cyrus Meher-Homji, Bechtel Corporation

This 3-part tutorial provides a comprehensive overview into the function, performance characteristics and typical operational issues for industrial gas turbines. The morning sessions will review the origins of industrial gas turbines, their design, main components, performance, and the impact of basic cycle parameters. Typical industrial applications for gas turbines will also be described, together with the specific requirements they impose such as fuel quality, inlet air filtration, compressor fouling and washing etc. The afternoon session will focus primarily on outage practices for heavy-duty gas turbines, including basic planning, equipment, parts handling and disassembly/reassembly techniques.



TUESDAY, OCTOBER 5TH | 8:30 – 10:00 a.m.

Hot Section Life Extension Strategies (TE Paper Session)

Tutorial Session | Room 342E

Session Chair: Doug Nagy, Liburdi Turbine Services

Session Co-Chair: Xijia Wu, NRC-CNRC

This Panel will look at some of the newest technologies and strategies that gas turbine users can apply to extend the life of expensive hot section hardware. Presentations based on papers published at ASME Turbo Expo.

- ☀ Evaluation of Turbine Airfoil Cooling Holes by Transient Infrared Methods - Jason Allen, GE Global Research Center
- ☀ Repair Process Technology Development & Experience for W501F Row 1 Hot Gas Path Blades - Ian Summerside, Power Systems Mfg, LLC (PSM)
- ☀ Low Load Operational Flexibility for Siemens F- & G-Class Gas Turbines - Douglas Roth, Siemens Energy Inc.
- ☀ Avoidance of Gas Turbine Failure using Metallurgical Analysis and Engine Health Monitoring as Predictive Tools - Pervez Canteenwalla, Liburdi Engineering

Inlet Conditioning/Air Treatment

Panel Session | Room 352A

Session Chair: Cyrus Meher-Homji, Bechtel Corporation

Session Co-Chair: John Forsyth, Turbine Air Systems

This session will cover key features for the selection of good air filtration systems and inlet system design, and power augmentation approaches for gas turbines. Attendees will get practical pointers relating to system design and operation of air filtration and an overview of inlet cooling and chilling technologies.

- ☀ Filter Failure During High Humidity Conditions - Hector Delgado, Southwest Research Institute
- ☀ Gas Turbine Inlet Air Chilling (TIC) – Fundamentals and Case Study - John Forsyth, Turbine Air Systems
- ☀ Benefits Using HEPA Filtration in Gas Turbine Air Inlet - Matthew Gore, W. L. Gore & Associates

TUESDAY, OCTOBER 5TH | 10:30 a.m. – 12:00 p.m.

Gas Turbine Materials for the Non-Metallurgist

Tutorial Session | Room 342E

Session Chair: Henry Bernstein, Gas Turbine Materials Associates

Experts in the field of gas turbine materials will present a tutorial on the application of gas turbine hot section materials for the benefit of industrial gas turbine users. Basic metallurgy of superalloys and high temperature coatings used in hot section, combustors, blades and vanes will be presented. The focus of the tutorial will be on how these materials degrade in service, how they are repaired, and failure analysis methods.

- ☀ Base Metals - Randy Thompson, Liburdi Turbine Services, LLC
- ☀ High Temperature Coatings - Henry Bernstein, Gas Turbine Materials Associates
- ☀ Failure Analysis - Ron Munson, M&M Engineering Associates, Inc.
- ☀ Repair - Hans van Esch, TEServices, Inc.

Aeroderivatives and Light Industrial Engines

Panel Session | Room 352A

Session Chair: Patrick Campbell, GE Oil & Gas

An overview and analysis of the latest gas turbine technology from a number of major equipment manufacturers: including upgrades, rerates and new applications of existing turbines, and reviews of recently introduced gas turbines. This session is designed to meet the growing demand from customers for increased efficiency, lower emissions and higher availability.

- ☀ GE Aeroderivatives - Tayo Montgomery, General Electric
- ☀ Rolls Royce Gas Turbine Update - Steve Richards, Rolls Royce Ltd
- ☀ Solar Turbines Incorporated - Martin Habel, Solar Turbines Inc.
- ☀ Siemens Gas Turbine Update - Mike Welch, Siemens Energy Oil & Gas

session details...

TUESDAY, OCTOBER 5TH | 2:00 – 3:30 p.m.

Gas Turbine Upgrades

Panel Session | Room 342E

Session Chair: Thom Eldridge, QatarGas/Qatar Shell Services Company

This session will include presentations of user experiences in successfully completing gas turbine upgrades, focusing on interaction with plant personnel and OEM or service provider. Attendees should expect to learn how other users have dealt with obstacles in planning, execution and return to service of gas turbines undergoing a variety of upgrades.

- ☀ GT Upgrades and CSAs - Brian Delamer, DelEnergy Services, LLC
- ☀ GT Upgrades - David May, Turbocare
- ☀ Getting OEM Follow Through on GT Upgrades - Jeff Buck, Shell

Gas Turbine Rotor Life Extension Issues versus OEM Directives

Panel Session | Room 352A

Session Chair: Xijia Wu, NRC-CNRC

While the OEM prescribes a definite safe life for the gas turbine rotor they produce, operators may see a different useful life depending on their operating profile. The key issue is the accurate assessment of life consumption based on the actual operational history of the concerned gas turbine engine(s) at the particular plant site. By referencing this information, the operators can make informed decisions on inspection, overhaul and repair.

- ☀ Lifetime Extension for STG6-5000F Rotors and Selected Casings - Piyush Sane, Siemens
- ☀ Extending Lives of Aging Gas Turbine Engines by Damage Tolerance Analyses and Experimental Verification - Wieslaw Beres, National Research Council Canada
- ☀ Analytical Approach to Extend Rotor Life - Pervez Canteenwalla, Liburdi

**Visit the ASME/IGTI
Booth #431**

*Stop by and pick up the
latest information on
ASME and IGTI activities.*



Introduction to Coatings (Part 1)

Tutorial Session | Room 342D

Session Chair: Doug Nagy, Liburdi Turbine Services

Modern gas turbines use various coatings to improve the functionality and durability of components. This tutorial session is aimed at gas turbine owners, operators and maintenance personnel to allow them to appreciate the nature of coatings as an engineering design tool. Coating uses, materials, processes and serviceability will be reviewed. Several case studies will be presented to show the design process in action.

Gas Turbine Replacement Parts

Panel Session | Room 342E

Session Chair: Ron Natole, Turbine Energy Solutions

Session Co-Chair: Brock Ramey, Industrial Info Resources

Replacement parts for industrial gas turbines- New OEM, New Alternative Source and Refurbished OEM. Perspectives of GT Users, OEMs, Third Party Suppliers and Consultants.

- ☀ GT Replacement Parts & Rotors - Melody Manning, Turbine Energy Solutions LLC.
- ☀ SuperAlloy GT Parts Machining - Mark Doelling, Dynamic Turbine LTD.
- ☀ GT Replacement Parts-Repair Shop Perspective - Mike Elliott, Allied Power Group

Gas Turbine Controls: Replacement/Upgrades

Panel Session | Room 352A

Session Chair: Richard Sessions, BTEC Turbines

This session will explore a controls change out from how to determine when to do one, through how to pick the best system for the application, planning, installation and commissioning. A case study is planned. Participant will benefit from exposure to the total upgrade cycle including details that can make your next change out a bit smoother.

- ☀ Gas Turbine Controls Upgrades: Software - Byron Broussard, Turbomachinery Control Solutions LLC.
- ☀ Gas Turbine Controls Upgrades: Hardware - Rodney Williams, GE Energy Control Solutions, Inc.
- ☀ Field Installation of a Gas Turbine Controls Upgrade - Martin Marsh, HPI LLC

session details...

WEDNESDAY , OCTOBER 6TH | 10:30 a.m. – 12:00 p.m.

Introduction to Coatings (Part 2)

Tutorial Session | Room 342D

Session Chair: Doug Nagy, Liburdi Turbine Services

Modern gas turbines use various coatings to improve the functionality and durability of components. This tutorial session is aimed at gas turbine owners, operators and maintenance personnel to allow them to appreciate the nature of coatings as an engineering design tool. Coating uses, materials, processes and serviceability will be reviewed. Several case studies will be presented to show the design process in action.

Perspective on CSA and LTSA

Tutorial Session | Room 342E

Session Chair: Thom Eldridge, QatarGas/Qatar Shell Services Company

Session Co-Chair: Henry Bernstein, Gas Turbine Materials Associates

This session will discuss the opportunities and limitations of Service Agreements as they are typically written for Gas Turbine systems. The audience will learn about the structure of the agreements and how to manage risks, both technical and commercial, inherent in the relationship. The presentation will be followed by an open forum for questions and clarifications.

☀ Perspective on CSA and LTSA - Brian Delamer, DelEnergy Services, LLC

Gas Turbine Controls: Remote Monitoring Diagnostics

Panel Session | Room 352A

Session Chair: Richard Sessions, BTEC Turbines

Session Co-Chair: Dorin Scheianu, Wood Group

This session will cover the logic of Remote Monitoring and Diagnostics and what points to monitor as well as how providers interpret the data. Benefits to the participant include familiarization with some of the various perspectives on how providers analyze the data and interpret trends and problems.

- ☀ RM&D Philosophy and Diagnosis Approach - Dorin Scheianu, Wood Group
- ☀ User Case Study: BP's Implementation of a Remotely Accessible Condition Monitoring System - J. Michael Allen, BP America
- ☀ RM&D Signals and the PI Platform - Travis Kaltenbach, Gas Turbine Efficiency

Joint Discussion Group With 39th Turbomachinery Symposium - Gas Turbine Operation and Maintenance

Discussion Session | Room 342D

Session Chair: Doug Nagy, Liburdi Turbine Services

Session Co-Chair: Cyrus Meher-Homji, Bechtel Corporation

This session will be an interactive discussion amongst attendees, dealing with topics of interest relating to GT operations and Maintenance. Topics typically include maintenance and spare parts, condition monitoring, air filtration, fuel issues, DLN issues, repair techniques, or any other topic that is of interest to the attendees.

Root Cause Failure Analysis

Panel Session | Room 342E

Session Chair: Manoj Gupta, Dresser-Rand Company

Session Co-Chair: Jason Kerth, Dresser-Rand Company

The session will be a combination of panel and case study presentations on Gas Turbine components and systems failures, presenting analysis techniques used to investigate and resolve the failures. It provides basic methodology for conducting root cause failure analysis and will discuss successful fixes.

- ☀ Dilkon GE Frame 3 Model J Turbine Failure - David Maas, El Paso Corporation
- ☀ RCFA Gas Turbine - Harold Simmons, SWRI
- ☀ A Fracture Mechanics Analysis for Turbine Blade Cracking - Xijia Wu, NRC-CNRC
- ☀ Gas Turbine Performance Degredation Due to Improper Control Curve - Robert Wood, Imperial Oil Resources

Heat Recovery Steam Generator (HRSG)

Panel Session | Room 352A

Session Chair: Richard Sessions, BTEC Turbines

This panel will discuss emerging ideas in how peaking GT exhaust systems with waste heat recovery need to be designed to comply with the new environmental movements on green house gas control. Benefits to the participant include technology discussions on current and future options and how a user can plan for systems to address current and future control requirements.

- ☀ Selective Catalytic Reduction (SCR) Units in Peaking Gas Turbine Service - Dennis Salbilla, Haldor Topsoe Inc.
- ☀ CO₂ Management: Regulatory Landscape and Applications for Carbon Capture and Sequestration (CCS) Systems - Jim Vopelius, Trident Risk Management, LLC
- ☀ Economic Assessment of Combined Cycle Plants in View of CO₂ Emissions Regulations - Dr. Majed Toqan, Creative Power Solutions



GTUS 2011 Planning Session

**Wednesday, October 6th | 3:45 - 5:15 p.m.
General Session | Room 352B**

Is GTUS Addressing Your User Issues?

Join your colleagues and provide feedback on the symposium. Let us know how to shape next year's program to better serve you.

Networking Dinner & Facility Tour

**Monday, October 4, 2010 | 6–9 p.m.
GE Aero Energy | Houston, Texas**

Please join us for a walking tour of the Houston GE LM series aeroderivative gas turbine packaging facilities and the GE LMS100 test bed (if available). Presentation by GE on the LMS100 program will follow the tour. Dinner will be provided at GE.

Note: Closed toe shoes required, safety glasses are requested.

Please note this dinner and tour is RSVP only.

Stop by the GTUS registration desk to confirm your RSVP.



Visit Us in Booth 431

*The Most Important Conference
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TURBO EXPO

Turbine Technical Conference & Exposition

Presented by ASME International Gas Turbine Institute

**Vancouver Convention
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Vancouver, British Columbia, Canada

June 6-10, 2011



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schedule at a glance

*Subject to change

SUNDAY, OCTOBER 3RD

GTUS Registration (Registration Area D, Level 2)4:30 p.m. – 6:00 p.m.

MONDAY, OCTOBER 4TH

GTUS Registration (Registration Area D, Level 2)7:00 a.m. – 12:00 p.m.

Pre-Symposium Workshops8:30 a.m. – 5:00 p.m.

GTUS Registration (Registration Area D, Level 2)1:30 p.m. – 5:00 p.m.

Facility Tour & Networking Dinner (Off-Site, RSVP Only) . . .6:00 p.m. – 9:00 p.m.

Hospitality Suites6:30 p.m. – 12:00 a.m.

TUESDAY, OCTOBER 5TH

GTUS Registration (Registration Area D, Level 2)7:30 a.m. – 5:00 p.m.

GTUS Information Desk8:00 a.m. – 4:00 p.m.

Welcoming Address (Assembly Theatre C, Level 3)8:00 a.m. – 8:35 a.m.

GTUS Conference Sessions8:30 a.m. – 12:00 p.m.

Delegate Lunch in Exhibit Hall (Exhibit Hall C)12:00 p.m. – 2:00 p.m.

GTUS Conference Sessions2:00 p.m. – 3:30 p.m.

Exhibit Open (Exhibit Hall C)3:30 p.m. – 7:00 p.m.

Hospitality Suites6:30 p.m. – 12:00 a.m.

Buffet Dinner (Hilton Ballroom of the Americas)7:30 p.m. – 9:00 p.m.

WEDNESDAY, OCTOBER 6TH

GTUS Registration (Registration Area D, Level 2)8:00 a.m. – 5:00 p.m.

GTUS Information Desk8:00 a.m. – 4:00 p.m.

GTUS Conference Sessions8:30 a.m. – 12:00 p.m.

Delegate Lunch in Exhibit Hall (Exhibit Hall C)12:00 p.m. – 2:00 p.m.

GTUS Conference Sessions2:00 p.m. – 3:30 p.m.

GTUS Steering Committee Meeting (Room 352B)3:45 p.m. – 5:15 p.m.

Exhibit Open (Exhibit Hall C)3:30 p.m. – 7:00 p.m.

Hospitality Suites6:30 p.m. – 11:00 p.m.

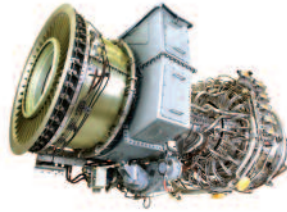
Banquet (Hilton Ballroom of the Americas)7:30 p.m. – 9:00 p.m.

THURSDAY, OCTOBER 7TH

Exhibit Open (Exhibit Hall C)9:30 a.m. – 12:00 p.m.

The LM6000 Enhanced Package builds on GE's proven aircraft engine technology to provide a new solution for offshore and onshore applications. It's designed for reliable operation in remote locations and under extreme conditions, while reducing operating costs and minimizing environmental impact. This integrated package offers a high performance gas turbine coupled with a centrifugal compressor for mechanical drive duty. All optimized for fast installation, high reliability, availability and reduced weight and footprint. geoilandgas.com

Lateral
thinking



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Innovation Now



GE imagination at work

The Gas Turbine Users Symposium (GTUS) is presented by the International Gas Turbine Institute (IGTI), an institute of the American Society of Mechanical Engineers (ASME). ASME is one of the world's oldest and most respected technical societies serving over 100,000 mechanical engineers in 134 countries.

IGTI is dedicated to supporting the international development and exchange of information to improve the design, application, manufacture, operation and maintenance, and environmental impact of all types of gas turbines, turbomachinery and related equipment.

For over fifty years IGTI has been the leading society for gas turbine professionals. For more information about joining one of IGTI's 16 technical committees and how IGTI's conferences, products and services can improve your company's profit margin and your own professional development, please contact us at:

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