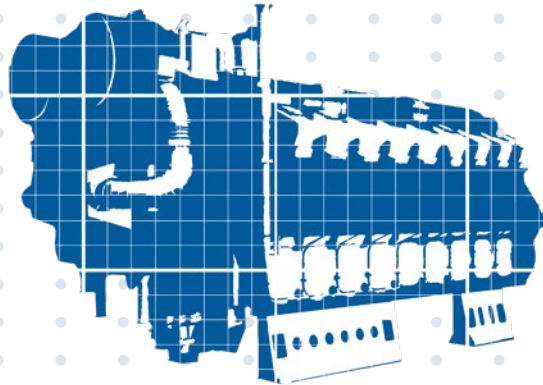


AVL



INNOVATIONS. MEET. SYNERGIES.



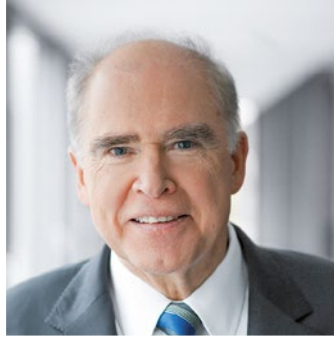
CONFERENCE PROGRAM

8th AVL LARGE ENGINES TECHDAYS

Electrification, New Fuels and Power Sources:
Boom or Doom for Large Engines?

April 11th-12th, 2018, Helmut-List-Halle, Graz, Austria

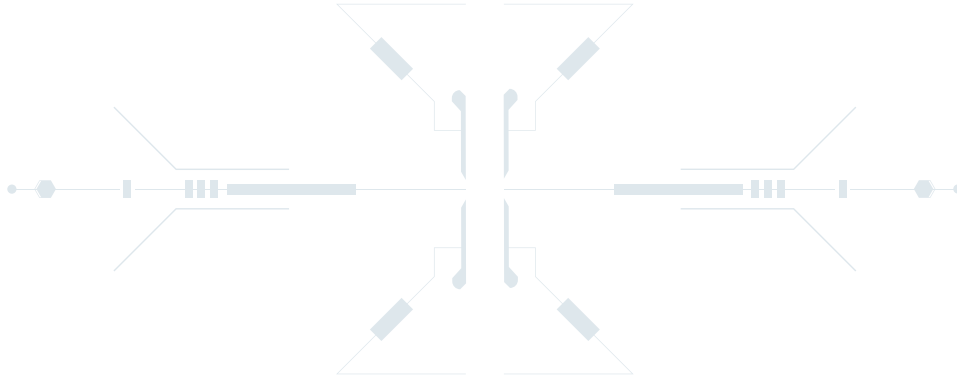
FOREWORD



The AVL Large Engines TechDays were first held in 2004. Since then this conference has established itself as a major event on the agendas of the worldwide industry engaged with large engines, their applications and systems. We will welcome again leading industry representatives, technical experts and opinion makers from engine manufacturers, users, regulatory organizations, suppliers and universities to this event in Graz. For all of them, the AVL Large Engine TechDays became a valuable biannual meeting place, enabling a good overview of current industry topics by exchanging information on technical solutions and the respective impact on the environment and the economics. In addition, the participants appreciate the networking opportunities during the conference. As always, the conference will address a high priority topic of the large engine industry.

This year it will be 'Electrification, New Fuels and Power Sources: Boom or Doom for Large Engines?'

In the next decade, the large engine application will be increasingly challenged by multiple factors. A new chapter of engine efficiency has just started, while global and local emission regulations still push the limits of traditional engine and exhaust gas aftertreatment development. Customers require robust solutions with maximum fuel flexibility – be it diesel fuel, natural gas or renewables such as hydrogen - mainly driven by fuel price. Especially for marine and mobile applications, the challenge will be to seamlessly integrate the combustion engines into overall systems, side-by-side with other power sources such as batteries, fuel cell etc.



The conference program of AVL's 8th Large Engines TechDays will focus on new technologies like electrification and hybridization, new fuels and competitive power sources as well as on traditional engine development.

As in previous years, the organizers of the Large Engine TechDays 2018 have compiled an interesting conference program. The key notes of well-established industry leaders illustrate their view on trends and electrification and new fuels in the large engine world and will be followed by a broad spectrum of presentations from industry experts highlighting various aspects of the main conference topic. The two conference days will be closed with the traditional panel discussion, engaging the audience in a lively dialogue with the panelists.

Beside the comprehensive information given by the presenters and the networking opportunities during the breaks you can enjoy the beautiful atmosphere and treats in the historic city of Graz and the province of Styria, the 'Green Heart' of Austria.

We are very much looking forward to welcoming and hosting you in Graz.

Prof. Dr. h.c. Helmut List
Chairman and CEO

Dr. Marko Dekena
Executive Vice President

GENERAL INFORMATION



Conference Office: AVL List GmbH, Hans-List-Platz 1, 8020 Graz, Phone: +43 316 787-927, E-Mail: event@avl.com

Conference Venue: Helmut-List-Halle, Waagner-Biro-Straße 98a, 8020 Graz. Shuttle bus service to conference hotels.

Registration: In the Helmut-List-Halle on Wednesday, April 11th, 2018 from 07:30

Conference Fee:

General admission: € 1,290.- plus 20 % VAT

Students: € 120 plus 20 % VAT

Free of charge for members of the press.

Fees include proceedings, 2 lunches and snacks, evening events.

Conference Language: English

Presentations: Presentations will be provided on a USB stick.

Hotel Reservation: Please see the reservation form attached or visit our webpage www.avl.com/letd-2018 to book your accommodation.

Evening Program: Tuesday, April 10th, 19:00 Welcome Reception at Skybar Graz

Wednesday, April 11th, 19:30 Social Evening at the Stefaniensaal/ Congress Graz

AVL Headquarters Visit: Tuesday, April 10th, 16:00: Join us to see our facilities in the afternoon before the Welcome Reception. Shuttle bus service to the Skybar Graz.

(Registration is mandatory)

Arrival: By plane: Graz-Thalerhof, By train: Graz Main Station, By car: see map of Graz

Subject to modifications.

CONFERENCE PROGRAM – TUESDAY, APRIL 10th, 2018

19:00	Welcome Cocktail at the Skybar Graz
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CONFERENCE PROGRAM – WEDNESDAY, APRIL 11th, 2018

08:45	Opening of the Conference, Dr. Marko Dekena, Executive Vice President, AVL List GmbH
09:15	Welcome Address, Siegfried Nagl, Mayor of the City of Graz
Chairman: Ulrich Walter	
09:30-10:00	KEYNOTE: Gas Engines as Essential Building Block for Distributed Power Generation Andreas Lippert, GM Product Management & Engineering, GE Distributed Power, GE Jenbacher GmbH & Co OG
10:00-10:30	KEYNOTE Thorsten Herdan, Director-General Energy, Federal Ministry for Economic Affairs and Energy, Germany
10:30-11:15	Break
11:15-11:45	Tentative: Large Diesel Engines and the "Energiewende" Diethard Plohberger, Liebherr Components Colmar SAS
11:45-12:15	Medium Speed Engines in the Dawn of Hybrids Leif-Arne Skarbo, Chief Technology Officer, Bergen Engines AS, a Rolls-Royce Power Systems Company
12:15-13:45	Lunch



CONFERENCE PROGRAM - WEDNESDAY, APRIL 11th, 2018

Chairman: Ulrich Walter	
13:45-14:15	Insight in the Development of MAN's Game Changing 45/60CR Engine Portfolio Alexander Knafel, Head of Advanced Engineering & Exhaust Gas Aftertreatment, Engineering 4-Stroke, MAN Diesel & Turbo SE
14:15-14:45	Wärtsilä Hybrid Solutions Mikael Wideskog, Director, Research & Technology Development, Wärtsilä Finland
14:45-15:30	Break
15:30-16:00	SOFC Application in Stationary and Automotive Industries: An Evaluation of the Opportunity and Challenges Brent Ness, Director, Growth Office, Cummins Inc
16:00-16:30	Fuels and Power for Container Vessels - a Decision between LNG, LSF's, HFO, Scrubbers, Electrical Solutions or Wall-together-Hybrids Dr. Hermann J. Klein, Managing Director CPO Holding (GmbH & Co.) KG and COO Offen Group
16:30-17:00	Fusion of Hybrid and LNG Toru Motoda, Manager / System Design Team, Marine Engineering Group, Engineering & Technology Center, Niigata Power Systems Co., Ltd.
19:00	Social Evening at Stefaniensaal/Congress Graz

CONFERENCE PROGRAM - THURSDAY, APRIL 12th, 2018

Chairman: Ulrich Walter	
08:30-09:00	Peak Performance in Board Operational Envelop Oliver Riemenschneider, Managing Director Business Unit ABB Turbocharging, ABB Turbo Systems Ltd.
09:00-09:30	Fuels Options for Large Engines - Today and Tomorrow Wolfgang Warnecke, Chief Scientist Mobility, Shell
09:30-10:00	Caterpillar's Large Power Systems - Solutions for diverse Customer Requirements David L. Froberg, Chief Engineer, Caterpillar Inc.
10:00-10:45	Break
10:45-11:15	"Energiewende" in Shipping Gerhard Untied, RD Energy and Environment, head of section; Daniel Sahren, RD projectmanager, MEYER WERFT GmbH & Co. KG
11:15-11:45	Electromobility in the Maritime World Christian Schmoll, Managing Director, TAMSEN MARITIM GmbH, Rostock; Michael Lueders, Managing Partner, DESIOS GmbH
11:45-12:15	Design Considerations for Microgrids Integration ICE, Battery Systems and Renewable Generators Giordano Torri, Chief Technology Officer, FINCANTIERI SI S.p.A.
12:15-13:45	Lunch
Chairman: Ulrich Walter	
13:45-14:15	Miba's Intelligent Bearing Condition Monitoring for Large-Bore Engines integrable in AVL EPOS™ Rainer Aufischer, CTO, Miba Bearing Group
14:15-14:45	Yara Birkeland - Worlds First Autonomous Zero Emission Container Feeder Ketil O. Paulsen, Technology General Manager, Kongsberg Maritime AS
14:45-15:15	From Waste Heat to Electricity - Maximizing Large Engine Efficiency using the CraftEngine Harald Nes Risla, R&D Director, Viking Heat Engines AS
15:15-16:00	Panel Discussion , Moderator Ulrich Walter
16:00-16:15	Closing Remarks , Dr. Marko Dekena, Executive Vice President, AVL List GmbH

ABOUT AVL



AVL is the world's largest independent company specializing in the design and development of powertrain systems (engines, transmissions, electric motors, batteries, control systems) for passenger cars, commercial vehicles and industrial applications, as well as powertrain test instrumentation and test systems. The activities of the Powertrain Engineering Division comprise all functions from concept definition through to production development. Supported by comprehensive in-house research, AVL's engineering specialists design and develop powertrains of all types and sizes for a worldwide clientele and carry out application-specific system integration to achieve optimum solutions. All of AVL's software and methodology development capabilities for engine and powertrain simulation

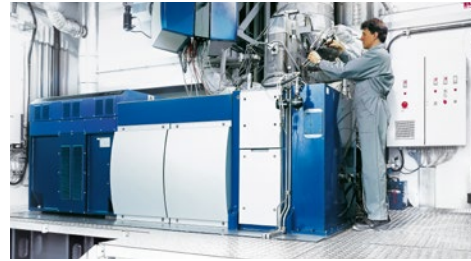
are concentrated in AVL's "software house", Advanced Simulation Technologies. Software tools designed by AVL represent state-of-the-art technology based on years of experience in engine and drivetrain development. These tools are used not only in-house, but also by leading engine and vehicle manufacturers worldwide.

AVL provides its customers with instrumentation technology and test systems for the entire product development process right up to mass production. AVL is a manufacturer and system integrator of complete test bed systems, delivering technologically superior tools for specific tasks, which can be individually adapted to meet the needs of different groups of users.

AVL LARGE ENGINES

Over the last 60 years, AVL has engineered around 100 large engines for all major applications, such as ships, power plants, locomotives and compressors. Worldwide, AVL has the most experienced independent engineering team in the industry with a wide range of development expertise. This enables AVL to design completely new large engines, from the first sketch to the finished product. Advanced simulation, efficient engineering methods and innovative technologies pave the way to higher product efficiency and quality.

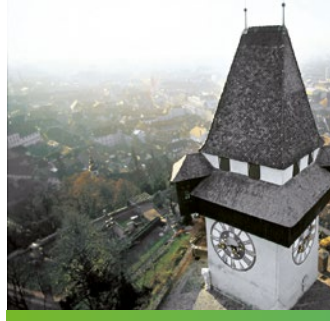
AVL's global engineering expertise in the field of powertrain integration results in efficient and comprehensive solutions for optimizing the entire performance – under consideration of the boundary conditions of the customer. It is about taking into consideration the engine and the additional application-specific systems of conventional and electrified systems while anticipating the challenges of less emissions and cost.



On the single-cylinder research test bed at the Large Engines Competence Center in Graz emission and fuel consumption technologies for the upcoming years are already being studied by AVL. Furthermore, AVL continuously proves its innovator role with regard to complex environments thanks to new applications and methodologies.



WELCOME TO GRAZ



Graz is indeed a striking beauty, to the point of rendering one sleepless. Self-confidently, the city presents itself both with new, fascinating landmarks and historic monuments, among them entire districts such as the Old City centre, honored and protected as a UNESCO World Cultural Heritage Site or the designation City of Design.

The city's 'lifeline' is the broad river Mur, providing a relaxed atmosphere to the rhythm of flowing water. But Graz is above all a melting pot of cultures. For centuries, musicians, writers, architects and designers have set the tone in this, the European Cultural Capital 2003.

So how do you go about exploring this impressive cultural heritage site? The answer is simply 'at your leisure'. Most of its many sights are located within easy reach of elegant coffee houses, fine restaurants, colorful country markets and trendy bars. Graz can be discovered and rediscovered time and time again. A noble flair reigns, as in the arcaded courtyard of the Landhaushof, a masterpiece of the Italian Renaissance.

Have no second thoughts about visiting the attractions: Eggenberg Palace, the Museum of Contemporary Art (Kunsthaus), Island in the Mur, Schlossberg, Opera and all the rest, the 'compulsory' tourist program in Graz is a pure pleasure.

Photos:
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Hans Wiesenhofer



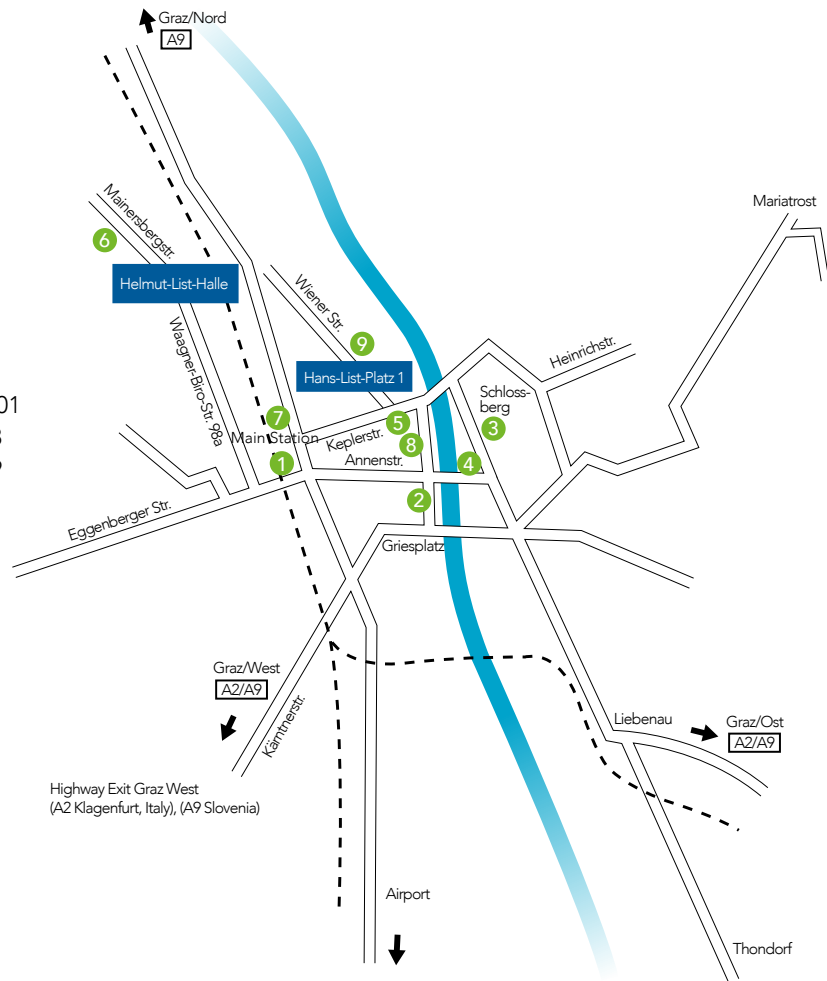
Hotel:

- 1 Hotel Daniel
- 2 Hotel Weitzer,
Hotel Wiesler
- 3 Schlossberghotel
- 4 Hotel Erzherzog Johann
- 5 Mercure Graz City
- 6 Hotel Bokan
- 7 Hotel Ibis
- 8 Hotel Feichtinger
- 9 Lendhotel

Taxi:

- Phone: +43 (316) 28 01
- Phone: +43 (316) 878
- Phone: +43 (316) 889

Highway Exit Graz North (A9 Salzburg, Linz, Germany)



Large Engines TechDays Sponsors:



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