



Meeting the Future of Combustion Engines 28th CIMAC WORLD CONGRESS

Combustion Engine Technology for
Ship Propulsion | Power Generation | Rail Traction





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WELCOME TO HELSINKI

A week full of opportunities

Dear friends of internal combustion engines,

It is my sincere pleasure to welcome you to beautiful Helsinki at this lovely time of the year. We are here to continue leading the way towards a step change for the most efficient, reliable, flexible, agile, and best source of energy conversion; the internal combustion engine. The weeks, months and years of preparation are now behind us, and we can feel the excitement building for the upcoming presentations and social events that this Congress offers.

I have had the opportunity to follow these preparations since the previous Congress in 2013 held in Shanghai, and I can assure you that no efforts have been spared to make this 2016 Congress successful in every respect. I would, therefore, like to extend my deepest gratitude to all the many people that have dedicated both time and “shoulder power” to make this happen.

The rest is now up to you. As with any party, it is the guests that decide the outcome. I encourage all of you to head into this week with an open mind, and to take advantage of the numerous opportunities for learning, exploring, and sharing ideas.

We come into the Congress at a time when we face numerous challenges. Oil prices are at the same level as when the Congress was last held in Helsinki in 1981 – 35 years ago, large investments are being put on hold in both the energy and marine markets, alternative sources of energy are becoming increasingly available, charter prices are at totally different levels than they were just five years ago, a combination of technologies and information management is opening up new avenues, and environmental awareness is, of course, creating to some extent a new agenda for our products. With the competences that we have accumulated, and the technologies and tools that we now have access to, we have both the possibilities and an obligation to address these issues. Like all engineers, I love challenges and see them as being there for one reason only – to be solved! So let's get to work and help make a more positive future.

As you have already seen in the Congress Programme, we have an interesting week ahead of us. I urge you to plan your days well so as to get the most out of it. Don't miss the Technical Tours on Friday, they are very much a part of the Congress and I'm sure you will be amazed at what you see. Our organizers have also arranged a varied and interesting week for your spouses and partners and our hope is that you will all carry happy memories home with you.

Last but not least: don't forget to have fun and make the most of the chance to add new friends to your network.

The week ahead is full of opportunities – let's grab them and benefit from them.



Robert Ollus

Congress President

Wärtsilä Corporation

A handwritten signature in dark ink, appearing to be 'R. Ollus', written in a cursive style.

The International Council on Combustion Engines – CIMAC – warmly welcomes you to the 28th CIMAC Congress in Helsinki.

Once again, the 2016 Congress brings together the leading expertise from engine manufacturers, component and system suppliers, rail, marine and power plant operators and users, technical universities, classification societies, and oil companies around the globe. With 189 papers to be presented during 47 Technical Sessions and additional 32 papers presented in the three poster sessions, the event will highlight the latest developments in products and technologies and the value they bring to the customer; they will elaborate on the scientific research that creates the foundation for the next generation of engines and address the needs of the market to ensure an environmentally and economically sustainable sound future.

In a first of its kind, the Congress will hold a special stage for the Users to present, discuss and deliberate on brewing issues related to user experiences in the industry. The Users Day on Wednesday is a new concept that will be immensely helpful to ship-owners and operators to meet engine manufacturers, engineers, researchers and scientists in the field to fill in the missing gaps that translate from the creators to the end-users. It will also be a great chance for the engine developers to hear the other side of the story from the Users. The Users Day will also feature the 'Collin Trust sponsored Keynote Speech' by Harry Robertsson, Technical Director at Stena Rederi AB, that will be centered around sustainable and realistic solutions for future shipping from the ship-owner's perspective. Last but not the least, the 'Users Reception' will culminate the collaborative efforts of all the participants involved at the end of the day for an effervescent evening with food and drink and will hope to lighten the mood for a very relaxed networking time for everyone concerned.

On the last Congress Day, we will be challenged to broaden our perspectives. The final panel discussion titled "The Lowest Oil Price in a Decade – A Game Changer for Ship Operators and Engine Makers?" will be chaired by Axel Kettmann from ABB Turbocharging, CIMAC Vice-President Communications. Prominent panelists from Wärtsilä and MAN, Maersk and from the Oil & Gas industry are going to discuss the cool down in the oil prices and its impact to our business.

Last but not least, the Congress offers a unique opportunity to generate business and build lasting networks. With more than 800 participants expected, it is the place to be for the large engine community. An exhibition with 53 exhibitors from 13 countries, covering an area of 798 net sqm is to be held simultaneously during the Congress. The optional tours will showcase the best that Helsinki and its surroundings can offer in terms of culture, nature, shopping, etc. With strong industrial traditions, Finland's innovative design and expertise across multiple sectors will be presented during the technical tours to a number of interesting places.

Helsinki welcomes you in early June, and so do I. As the CIMAC President I am looking forward to meeting you at the Finlandia Hall!



Christoph Teetz

CIMAC President

Rolls-Royce Power Systems

A handwritten signature in dark ink, appearing to read 'Christoph Teetz'.

THE FEDERATION OF FINNISH TECHNOLOGY INDUSTRIES

The Federation of Finnish Technology Industries welcomes you to Finland and to our beautiful capital Helsinki.



We hope you will fully enjoy the Congress, the fresh Finnish nature and our beautiful cultural atmosphere during your stay in Helsinki.

The Federation of Finnish Technology Industries is the lobbying organisation for technology industry companies. We promote competitiveness and the operational preconditions for this largest and most important export sector in Finland. A constantly developing technology industry creates the basis for the Finnish welfare state. The Federation of Finnish Technology Industries has over 1,600 member companies. The technology industry makes up 50% of Finnish exports and 80% of R&D investments in the private sector. This sector employs almost 280,000 people directly, and 700,000 people in total. This equates to about 30% of the entire Finnish labour force.

Mechanical Engineering and Manufacturing Industry in Finland

The enterprises within the mechanical engineering and manufacturing industry in Finland employ 125,000 people, making this sector the largest employer in the technology industry with a turnover of EUR 24.4 billion. Successful industry products include cruise liners, engines for ships and power plants, pulp and paper machines, rock and mineral processing equipment, lifts, hoists and cranes, forestry and agricultural machinery, and of course the orange-handled Fiskars scissors. Companies in this sector know how to apply new technologies rapidly to customer-driven products and production processes. It is increasingly popular for companies to form cooperation networks that produce total tailor-made solutions to meet the customers' individual needs. This allows each company to successfully focus on their core competencies, creating more jobs also in subcontractor companies.

The National Member Association of CIMAC – Combustion Engine and Turbo Charging Branch Group – within the Federation of Finnish Technology Industries coordinates the cooperation between industry companies in industrial policy, economic policy and environmental issues.

The purpose of the branch group is to monitor and influence international trends, mainly through technological cooperation.

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From
June 6,
2016!

It contains the technical programme, general information, floor plans and additional information for the 28th CIMAC WORLD CONGRESS.



CIMAC
CONGRESS
HELSINKI | JUNE 6-10, 2016



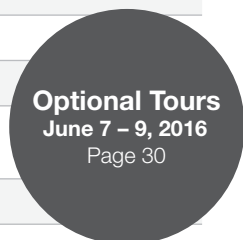
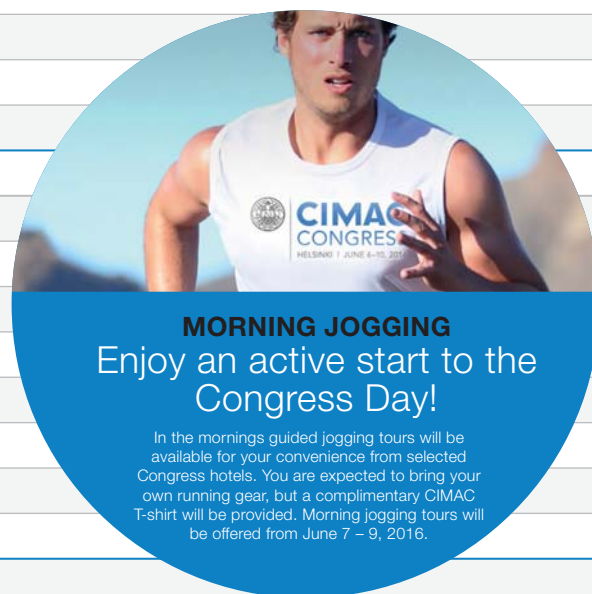
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CONGRESS OVERVIEW

Day	Time	Activities
Monday June 6, 2016	10:00 – 11:30	Opening Ceremony
	12:00 – 13:00	Lunch
	12:00 – 13:00	CIMAC Press Conference Aurora Hall
	13:30 – 15:00	Technical Sessions
	15:00 – 15:30	Coffee Break
	15:30 – 17:00	Technical Sessions
	18:30 – 20:30	Welcome Reception
Tuesday June 7, 2016	08:30 – 17:00	Poster Session
	08:30 – 10:00	Technical Sessions
	10:00 – 10:30	Coffee Break
	10:30 – 12:00	Technical Sessions
	12:00 – 13:00	Lunch
	13:30 – 15:00	Technical Sessions
	15:00 – 15:30	Coffee Break
	15:30 – 17:00	Technical Sessions
	18:00	ABB Evening
	09:00 – 17:00	Poster Session
Wednesday June 8, 2016	09:00 – 10:30	Technical Sessions
	10:30 – 11:00	Coffee Break
	11:00 – 12:00	Keynote Speech by Harry Robertsson Technical Director, Stena Rederi AB
	12:00 – 13:00	Lunch
	13:30 – 15:00	Technical Sessions
	15:00 – 15:30	Coffee Break
	15:30 – 17:00	Technical Sessions
	15:30 – 18:00	Users Reception
	08:30 – 17:00	Poster Session
	08:30 – 10:00	Technical Sessions
Thursday June 9, 2016	10:00 – 10:30	Coffee Break
	10:30 – 12:00	Technical Sessions
	12:00 – 13:00	Lunch
	13:00 – 14:30	Technical Sessions
	14:30 – 15:00	Coffee Break
	15:00 – 16:30	Final Panel Discussion
	19:00	Gala Dinner
	09:00 – 16:00	Technical Tours (Artic Tour, Fuel Tour, Research & Competence Tour)
	08:30 – 17:00	Technical Tours (The Roots of Industry in Finland)
Friday June 10, 2016		



TOPICS AND SESSIONS

1. Product Development – Diesel Engines

- 1.1 High Speed Engines
- 1.2 Medium Speed Engines I
- 1.3 Medium Speed Engines II
- 1.4 Low Speed Engines
- 1.5 Field Experience

2. Product Development – Gas & Dual Fuel Engines

- 2.1 High Speed and Small Medium Speed Engines
- 2.2 Medium Speed Engines I
- 2.3 Medium Speed Engines II
- 2.4 Medium Speed Engines III
- 2.5 Low and Medium Speed Engines & Users Aspects

3. Fuel Injection & Gas Admission

- 3.1 Gas Applications I
- 3.2 Common Rail Developments
- 3.3 Diesel Applications
- 3.4 Gas Applications II

4. Turbochargers & Air/Exhaust Management

- 4.1 New Products
- 4.2 2-Stage Turbocharging
- 4.3 Technologies and Applications

5. Components & Tribology

- 5.1 Piston, Liner and Wear
- 5.2 Crankshaft
- 5.3 Bearings
- 5.4 Components Design

6. Controls & Automation

- 6.1 Engine Control Systems
- 6.2 Controls Applications
- 6.3 Combustion Control and Diagnostics

7. Exhaust Gas Aftertreatment

- 7.1 NOx Reduction – Medium Speed
- 7.2 NOx Reduction – Low Speed
- 7.3 SOx, Particulates and Classification

8. Basic Research & Advanced Engineering

- 8.1 Basic Study 1
- 8.2 Basic Study 2
- 8.3 New Simulation
- 8.4 New Concept
- 8.5 New Combustion 1
- 8.6 New Combustion 2
- 8.7 New Measurements
- 8.8 New Systems for Emission

9. System Integration & Optimisation

- 9.1 Ship, System and Component Design
- 9.2 Integration Methodologies
- 9.3 Ship Related Issues

10. Fuels, Lubricants & Fluid Technologies

- 10.1 Traditional Fuels
- 10.2 New Fuels I
- 10.3 New Fuels II
- 10.4 Lube Oil Technology I
- 10.5 Lube Oil Technology II

11. Users' Aspects, Maintenance & Monitoring – Marine Applications

- 11.1 Tribology and Cylinder Oil
- 11.2 Emission Technologies and Choices
- 11.3 Field Experience back to Engineering / Training

12. Users' Aspects, Maintenance & Monitoring – Land-based Applications

- 12.1 Users' Aspects, Maintenance & Monitoring – Land-based Applications

TECHNICAL PROGRAMME **MONDAY**

Day	Finlandia Hall	Wärtsilä Hall (Helsinki Hall)	MTU Hall (Terrace Hall)	AVL Hall (Veranda 4)
Monday June 6, 2016	1 Product Development – Diesel Engines 1-1 High Speed Engines	3 Fuel Injection & Gas Admission 3-1 Gas Applications I	4 Turbochargers & Air/ Exhaust Management 4-1 New Products	8 Basic Research & Advanced Engineering 8-1 Basic Study 1
13:30 – 15:00	Chair: Christoph Teetz, MTU Friedrichshafen, Germany Co-chair: Diego Delneri, Wärtsilä, Finland 266 The New ZVEZDA's Multi-Purpose High Speed Diesel Engine Family "PULSAR-M150" Wolfgang Kling, AVL List GmbH, Austria 93 UDMZ's New DM-185 Diesel Engine Family Martin Muther, FEV GmbH, Germany 164 GE Distributed Power's new 616 Diesel Genset - Applying platform strategies across GE's businesses to provide fast product solutions for new segments Ian Calvert, GE Distributed Power, Austria 196 The New MTU Series 4000 with Advanced Technological Concepts for EU Stage IIIB, EPA Tier 4 and IMO 3 Emission Legislations Steffen Harscher, MTU Friedrichshafen, Germany	Chair: Andreas Wimmer, LEC GmbH, Austria Co-chair: Tarmo Mäkelä, Parker Hannifin Corporation, Finland 39 Simplified L'Orange fuel injection system for Dual Fuel applications Clemens Senghaas, L'Orange GmbH, Germany 156 Development Methodology for the new Large Engine Gas Admission Valves by Robert Bosch Peter Christiner, Robert Bosch AG, Austria 78 Detailed Assessment of an Advanced Wide Range Diesel Injector for Dual Fuel Operation of Large Engines Constantin Kiesling, LEC GmbH, Austria 306 Research on the Influence of Diesel Injection Law to Combustion Process of Micro Ignition Dual Fuel Engine Yue Li, Harbin Engineering University, China	Chair: Christian Roduner, ABB Turbo Systems, Switzerland Co-chair: Teemu Turunen-Saaresti, Lappeenranta University of Technology, Finland 246 New single-stage turbocharger for large high speed diesel engines Michael Gisiger, ABB Turbo Systems, Switzerland 76 New Generation Development for Mitsubishi Turbocharger Sakamoto Koichi, Mitsubishi Heavy Industries, Japan 105 ETB - Electrical Turbo Blower MAN's EGR Blower Series Arman Garshasebi, MAN Diesel & Turbo, Germany 194 Radial Turbocharger for small bore Marine Auxiliary Engines Joel Schlienger, ABB Turbo Systems, Switzerland	Chair: Ralf Marquard, FEV GmbH, Germany Co-chair: Martti Larmi, Aalto University, Finland 268 Integrated Simulation Approach for Driveline Development to Meet Future Demands in Large Engine Development Nikola Naranca, AVL-AST d.o.o, Croatia 140 Utilization of simulation technology for diesel engine development in Niigata Toshiyuki Saito, Niigata Power Systems Co. Ltd., Japan 83 Active cylinder technology in Wärtsilä engines Niclas Liljenfeldt, Wärtsilä Corporation, Finland 234 Wärtsilä 31 – Industrial design in a modular engine architecture Jonas Åkerman, Wärtsilä Corporation, Finland
15:00 – 15:30	Coffee Break			

Day	Finlandia Hall	Wärtsilä Hall (Helsinki Hall)	MTU Hall (Terrace Hall)	AVL Hall (Veranda 4)
Monday June 6, 2016	1 Product Development – Diesel Engines 1-2 Medium Speed Engines I	3 Fuel Injection & Gas Admission 3-2 Common Rail Developments	4 Turbochargers & Air/ Exhaust Management 4-2 2-Stage Turbocharging	8 Basic Research & Advanced Engineering 8-2 Basic Study 2
15:30 – 17:00	<p>Chair: Paul Flynn, GE, United States Co-chair: Olli Rantanen, Parker Hannifin, Finland</p> <p>135 Update on the extended engine portfolio of Anglo Belgian Corporation Lieven Vervaeke, Anglo Belgian Corporation N.V., Belgium</p> <p>181 The next generation of MDT's large bore diesel engines Sebastian Kunkel, MAN Diesel & Turbo, Germany</p> <p>285 Product Technology Development for Increased Customer Benefits Ilari Kallio, Wärtsilä Corporation, Finland</p> <p>112 Introducing a Completely New Medium Speed Engine Ben Rogers, Ricardo, United Kingdom</p>	<p>Chair: Lars Nerheim, Bergen University, Norway Co-chair: Kalevi Huhtala, Tampere University of Technology, Finland</p> <p>232 Development of CR Technology in the last decade – 4 Stroke Wartsila Engines Dave Jay, Wärtsilä Corporation, Finland</p> <p>215 The new modular MAN Common-Rail System for future HFO-applications Johann Wloka, MAN Diesel & Turbo, Germany</p> <p>184 New Developments and Service Experience with OMT's Latest Generation Common Rail Injector Marco Coppo, OMT S.p.A., Italy</p> <p>94 An engine layout study for common rail systems in large diesel engines Alkan Göcmen, Peter Fuchs Technology Group AG, Switzerland</p>	<p>Chair: Alexander Rippl, MAN Diesel & Turbo, Germany Co-chair: Teemu Syrjänen, ABB Oy Turbocharging, Finland</p> <p>191 Experience of 2-stage turbocharged engines Matti Vaarasto, Wärtsilä Corporation, Finland</p> <p>280 Valve Control Management and Power2® - the Answers to Highly Demanding Diesel Engine Applications Christoph Mathey, ABB Turbo Systems, Switzerland</p> <p>265 Turbocharger Solutions for New Engine Generations Silvio Risse, Kompressorenbau Bannewitz GmbH, Germany</p> <p>281 Power2® – Is 2-Stage Turbocharging Interesting for 2-Stroke Engines? Raphael Ryser, ABB Turbo Systems, Switzerland</p>	<p>Chair: Stefan Pischinger, FEV GmbH, Germany Co-chair: Päivi Aakko-Saksa, VTT Technical Research Centre of Finland, Finland</p> <p>52 Pros and Cons of Exhaust Gas Recirculation for Emission Reduction of Medium Speed Diesel Engines Carsten Rickert, Caterpillar Motoren GmbH & Co. KG, Germany</p> <p>148 Development of Low Fuel Consumption Technology for Medium Speed Diesel Engines Yoshinori Fukui, Yanmar Co. LTD., Japan</p> <p>173 Virtual Design and Simulation in two-stroke marine Engine Development Alexander Brueckl, Winterthur Gas & Diesel, Switzerland</p> <p>262 Combustion Analysis in a Natural Gas Engine With Pre-Chamber to Improve Thermal Efficiency Yasuo Moriyoshi, Chiba University, Japan</p>
18:30 – 20:30	Welcome Reception at the City Hall, Helsinki			

TECHNICAL PROGRAMME **TUESDAY**

Day	Finlandia Hall	Wärtsilä Hall (Helsinki Hall)	MTU Hall (Terrace Hall)	AVL Hall (Veranda 4)
Tuesday June 7, 2016	1 Product Development – Diesel Engines 1-3 Medium Speed Engines II	6 Controls & Automation 6-1 Engine Control Systems	5 Components & Tribology 5-1 Piston, Liner and Wear	8 Basic Research & Advanced Engineering 8-3 New Simulation
08:30 – 10:00	<p>Chair: Robert Beran, AVL List GmbH, Austria Co-chair: Olli Rantanen, Parker Hannifin, Finland</p> <p>95 HHM 12MV390 – Heading the new Hudong Medium Speed Engine Family Markus Hermanns, FEV GmbH, Germany</p> <p>186 New Generation HiMSen, H21C Engine Ki Hoon Jang, Hyundai Heavy Industries, Republic of Korea</p> <p>225 Wärtsilä 31 – World's most efficient four-stroke engine Ulf Åstrand, Wärtsilä Corporation, Finland</p> <p>307 The New Bergen B33:45 Medium Speed Diesel Engine Series - An Essence of 30 Years Experience in the 3x cm Bore Class Peter Koch, Rolls-Royce Power Systems, Norway</p>	<p>Chair: Rick Boom, Woodward, Netherlands Co-chair: Kalevi Huhtala, Tampere University of Technology, Finland</p> <p>96 Next generation UNIC automation system to enable Wärtsilä 31 performance Jonatan Røsgren, Wärtsilä Corporation, Finland</p> <p>195 Development of HiLS system for HiMSen Dual Fuel Engine Seunghyup Ryu, Hyundai Heavy Industries, Republic of Korea</p> <p>65 Dynamic 2-stroke engine model for Hardware-in-the-Loop testing Steffen Tscherch, Winterthur Gas & Diesel, Switzerland</p> <p>211 OpenECS: Universal Engine Control System Platform with open software based on an industrial PLC Martin Greve, AVAT Automation GmbH, Germany</p>	<p>Chair: Franz Koch, hofer at GmbH, Germany Co-chair: Sakari Pislä, Componenta Corporation Pistons, Finland</p> <p>67 Interaction between ship operation and cylinder lubrication of marine two-stroke diesel engines Markus Weber, Winterthur Gas & Diesel, Switzerland</p> <p>231 Valve Wear in lean-burn Valve wear in lean-burn large bore gas engines – From engine tests of components to a unique tribological test rig Oliver Lehmann, Märkisches Werk GmbH Germany</p> <p>283 Lubtronic SIP promise remarkably low wear rates with low CLO consumption Peter Jensen, Hans Jensen Lubricators A/S, Denmark</p> <p>302 How Can We Improve Peripheral Wear of Piston Rings for Low Speed Diesel Engine Minoru Kawanishi, Riken Corporation, Japan</p>	<p>Chair: Peter Heuser, FEV GmbH, Germany Co-chair: Ossi Kaario, Aalto University, Finland</p> <p>104 Effect of Injection Pressure in a Reacting Diesel Spray: Large-Eddy Simulation on the ECN Spray A Heikki Kahila, Aalto University, Finland</p> <p>213 Simulation of a Dual-Fuel Large Marine Engines using combined 0/1-D and 3-D Approaches Jöran Ritzke, University of Rostock, Germany</p> <p>126 Dynamic Behaviour of Gas and Dual-Fuel Engines: Using Models and Simulations to Aid System Integration Ioana Georgescu, Delft University of Technology, Netherlands</p> <p>124 Use of 1-D simulation tools with a physical combustion model for the development of Diesel-Gas or Dual Fuel engines Eike Joachim Sixel, Caterpillar Motoren GmbH & Co. KG, Germany</p>
10:00 – 10:30	Coffee Break			

Day	Finlandia Hall	Wärtsilä Hall (Helsinki Hall)	MTU Hall (Terrace Hall)	AVL Hall (Veranda 4)
Tuesday June 7, 2016	1 Product Development – Diesel Engines 1-4 Low Speed Engines	8 Basic Research & Advanced Engineering 8-4 New Concepts	5 Components & Tribology 5-2 Crankshaft	10 Fuels, Lubricants & Fluid Technologies 10-4 Lube Oil Technology I
10:30 – 12:00	<p>Chair: Patrick Hupperich, FEV GmbH, Germany Co-chair: Martti Larmi, Aalto University, Finland</p> <p>120 The Development of the Modern Low-Speed Two-Stroke Marine Diesel Engine Andreas Kyrtatos, Winterthur Gas & Diesel, Switzerland</p> <p>149 The Latest Technologies of Mitsubishi UEC Engine Katsumi Imanaka, Mitsubishi Heavy Industries, Japan</p> <p>116 MAN B&W Two-stroke Engines – Latest design development within engine types, Tier III and multiple gas fuels Susanne Kindt, MAN Diesel & Turbo, Denmark</p> <p>142 Development of Low Pressure Exhaust Gas Recirculation System for Mitsubishi UE Diesel Engine Naohiro Hiraoka, Mitsubishi Heavy Industries, Japan</p>	<p>Chair: Volkmar Hauelsen, ABB Turbo Systems, Switzerland Co-chair: Kari Tammi, Aalto University, Finland</p> <p>272 The Large Engines Validation Challenge in the Context of New Exhaust Emissions Regulation Christopher Huber, AVL List GmbH, Austria</p> <p>128 Advantages of Statistical Methods in Development of Combustion Concepts for Large Engines Michael Engelmayer, LEC GmbH, Austria</p> <p>244 Performance of a Heavy-Duty Single Cylinder DI Diesel Engine in PCCI mode with Miller Valve Timing Clemens Brückner, ETH Zürich, Switzerland</p> <p>17 From HERCULES A-B-C to HERCULES-2: A classic cooperative programme in large engine R&D Nikolaos Kyrtatos, National Technical University of Athens, Greece</p>	<p>Chair: Simon Brewster, Ricardo, United Kingdom Co-chair: Kim Backman, Mapromec, Finland</p> <p>151 Influence of Inclusion Size on Fatigue Strength and Stress Assessment for Forged Crankshaft under Multiaxial loading Tomoya Shinozaki, Kobe Steel Ltd., Japan</p> <p>180 Crankshaft Development with Virtual Engine Modelling Tero Frondelius, Wärtsilä Corporation, Finland</p> <p>98 Firing order optimization in FEV Virtual Engine Konrad Buczek, FEV Polska sp. z o.o., Germany</p> <p>169 Firing Order Optimisation on Large Bore Engines for Gas Exchange, Mechanical Loading and Fuel Consumption Improvement Tom Deighan, Ricardo, Germany</p>	<p>Chair: Rainer Aufischer, Miba Gleitlager Austria GmbH, Austria Co-chair: Kai Juoperi, Wärtsilä, Finland</p> <p>121 Performance Assessment of a New Generation Gas Engine Lubricant- Novel Developmental Screening Methodology Ramakumar Sankara SV, IndianOil Corporation Limited, India</p> <p>133 Premium Long-Life Stationary Natural Gas Engine Lubricant Oil Technology for Increased Up-Time and Reduced Maintenance Virginia Carrick, The Lubrizol Corporation, United States</p> <p>276 Improving the Efficiency of Next Generation Gas Engines with Lubricant Formulation Choice Jonathan Hughes, Infineum, United Kingdom</p> <p>25 B20 fuel effects on engine lubricating oil properties Katriina Sirviö, University of Vaasa, Finland</p>
12:00 – 13:00	Lunch			

TECHNICAL PROGRAMME **TUESDAY**

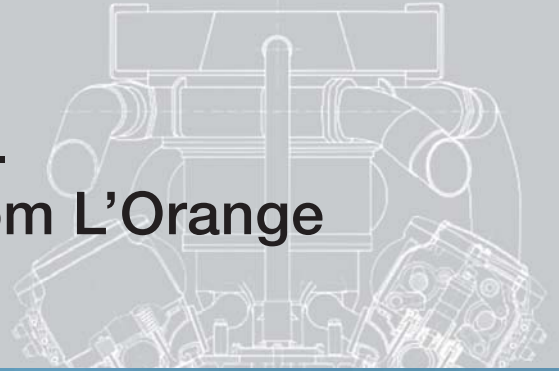
Day	Finlandia Hall	Wärtsilä Hall (Helsinki Hall)	MTU Hall (Terrace Hall)	AVL Hall (Veranda 4)
Tuesday June 7, 2016	2 Product Development – Gas & Dual Fuel Engines 2-1 High Speed and Small Medium Speed Engines	6 Controls & Automation 6-2 Controls Applications	5 Components & Tribology 5-3 Bearings	8 Basic Research & Advanced Engineering 8-5 New Combustion 1
13:30 – 15:00	Chair: Gunnar Stiesch, MAN Diesel & Turbo, Germany Co-chair: Jari Hyvönen, Wärtsilä, Finland 53 MTU Series 4000 for Natural Gas Operation in Ships – Challenges for high Speed Gas Engines in Mobile Applications Udo Sander, MTU Friedrichshafen, Germany 273 Holistic Approach for Performance and Emission Development of High Speed Gas and Dual Fuel Engines Shinsuke Murakami, AVL List GmbH, Austria 77 Development of the New DAIHATSU 2MW Class Dual-Fuel Engine for Marine Use Keita Kawase, Daihatsu Diesel Mfg. Co. Ltd., Japan 49 New marine gas engine development in YANMAR Ohashi Issei, Yanmar Co. Ltd., Japan	Chair: Fredrik Östman, Wärtsilä Corporation, Finland Co-chair: Kalevi Huhtala, Tampere University of Technology, Finland 40 Cylinder Individual Combustion Control of Gas and Dual Fuel Engines Klaus Schmid, AVAT Automation GmbH, Germany 56 Gas Engine for Marine Application: Modeling and Control Oleksiy Bondarenko, National Maritime Research Institute, Japan 161 State-Based Diesel Fueling for Improved Transient Response in a Dual-Fuel-Engine Ryan Roecker, Southwest Research Institute, United States 223 Model-Based Design and Development of Power Turbine Generator Waste Heat Recovery Systems Kalevi Tervo, ABB Marine, Finland	Chair: Edgar Gust, Zollern, Germany Co-chair: Petri Kuosmanen, Aalto University, Finland 218 Understanding and maintaining high bearing life in a reduced friction crank train system Martin Offenbecher, Miba Gleitlager Austria GmbH, Austria 198 Development trend of Aluminum alloy bearing for medium and high speed engines Akihiro Kose, Daido Metal Co. Ltd., Japan 141 Theoretical and experimental oil film characteristics of an externally-pressurized crosshead bearing to enhance the load carrying capacity Masaaki Endo, Daido Metal Co. Ltd., Japan 320 Adaptive Tin-Based Journal Bearing Overlays for Future Generations of High- and Medium-Speed Engines Johann Nagl, Miba Gleitlager Austria GmbH, Austria	Chair: Ioannis Vlaskos, Ricardo, Germany Co-chair: Katriina Sirviö, University of Vaasa, Finland 32 Unburned Hydrocarbon Emissions from Lean Burn Natural Gas Engines – Sources and Solutions Joel Hiltner, Hiltner Combustion Systems, United States 43 Impact of the Fuel Gas Quality on the Efficiency of a Large Gas Engine Thomas Lauer, TU Wien, Austria 80 Combustion System Development for a Large Bore Gas Engine – Efficient Combination of Simulation and Experiment José Geiger, FEV GmbH, Germany 171 Understanding of combustion process in a premixed lean burn gas engine fueled with hydrogen enriched natural gas Satoshi Kawauchi, National Maritime Research Institute, Japan
15:00 – 15:30	Coffee Break			

Day	Finlandia Hall	Wärtsilä Hall (Helsinki Hall)	MTU Hall (Terrace Hall)	AVL Hall (Veranda 4)
Tuesday June 7, 2016	2 Product Development – Gas & Dual Fuel Engines 2-2 Medium Speed Engines I	6 Controls & Automation 6-3 Combustion Control and Diagnostics	5 Components & Tribology 5-4 Components Design	8 Basic Research & Advanced Engineering 8-6 New Combustion 2
15:30 – 17:00	<p>Chair: Joel Hiltner, Hiltner Combustion Systems, United States Co-chair: Tommy Rönnskog, Componenta Corporation Pistons, Finland</p> <p>163 MAN Diesel & Turbo SE's Medium Speed Gas Engine Portfolio – a Modular Matrix Design Matthias Auer, MAN Diesel & Turbo, Germany</p> <p>27 G20CM34 – A highly flexible 10 MW gas engine concept Marius Wolfgramm, Caterpillar Motoren GmbH & Co. KG, Germany</p> <p>189 Improvement of power generation efficiency and heat recovery of cooling energy in Mitsubishi KU30GSI gas engine for better heat and power utilization Hiroshi Yoshizumi, Mitsubishi Heavy Industries, Japan</p> <p>212 Investigation of alternative dual fuel engine concepts Hendrik Lange, Caterpillar Motoren GmbH & Co. KG, Germany</p>	<p>Chair: Bert Ritscher, Caterpillar Motoren GmbH & Co. KG, Germany Co-chair: Jonatan Rösgren, Wärtsilä, Finland</p> <p>51 Controlling Tier III Technologies Morten Vejlggaard-Laursen, MAN Diesel & Turbo, Denmark</p> <p>109 Next generation of four-stroke control and monitoring architectures – based on a modular kit concept, also considering an electronic condition-based maintenance management Stephan Dannhauer, MAN Diesel & Turbo, Germany</p> <p>118 Securing Engine Performance and Safety through Fault Diagnostics Fredrik Östman, Wärtsilä Corporation, Finland</p> <p>209 Potential and Challenges of Technology Transfer from On Road Applications to Large Bore Diesel Engines Robert Bank, FVTR GmbH, Germany</p>	<p>Chair: Yasuhiro Itoh, Niigata Power Systems Co. Ltd., Japan Co-chair: Petri Kuosmanen, Aalto University, Finland</p> <p>203 Pre-Chamber Design Criteria for High Efficiency Gas Engines Ioannis Vlaskos, Ricardo, Germany</p> <p>263 Tribology Design for Components of HIMSEN Engine Sangdon Lee, Hyundai Heavy Industries, Republic of Korea</p> <p>254 3D Printing - Additive Manufacturing Technologies on the Rise Alexander Sakotnig, GE Jenbacher, Austria</p> <p>72 Torsional System Modelling: Balancing and Diagnosis Application in Two Stroke Low Speed Power Plant Diesel Engine Francisco Jimenez Espadafor, Seville University, Spain</p>	<p>Chair: Koji Takasaki, Kyushu University, Japan Co-chair: Ville Vuorinen, Aalto University, Finland</p> <p>136 Combustion Behavior in Largest 2-Stroke Gas Engine Takayuki Hirose, IHI Corporation, Japan</p> <p>147 The Examination on the Main Contributing Factors of Lube Oil Pre-Ignition Shinji Yasueda, GDEC inc., Japan</p> <p>257 Improving Efficiency of the Premixed Combustion by Reducing Cyclic Variability Emmanuella Sotiropoulou, Prometheus Applied Technologies LLC, United States</p> <p>70 Fuel flexibility of the future combustion engine power plants Päivi Aakko-Saksa, VTT Technical Research Centre of Finland Ltd., Finland</p>
18:00	ABB Evening			

POSTER SESSION **TUESDAY**

Day	Balcony 3rd floor		
Tuesday June 7, 2016 08:30 – 17:00	8	Basic Research & Advanced Engineering	20 Analysis of Temperature Fields of the Cylinder Head and Liner of a 2-stroke Marine Engine by CFD-FEA Coupling Method Liyan Feng, Dalian University of Technology, China
			137 Structural Analysis of Large Diesel Generator in Resilient and Rigid Support Mounting based on Vibration Measurement Don Chool Lee, Mokpo National Maritime University, Republic of Korea
			197 Automatic simulation platform to support product design Antti Hynninen, VTT Technical Research Centre of Finland Ltd., Finland
			216 Simulation Based Grid Compliance Juho Könnö, Wärtsilä Corporation, Finland
			267 The 60% Efficiency Reciprocating Engine: A Modular Alternative to Large Scale Combined Cycle Power Adam Gurr, Ricardo, United Kingdom
			66 A reverse estimation method calculating the coupling dynamic stiffness applied to fault diagnosis Mengqi Wang, Harbin Engineering University, China
			300 Numerical and Experimental Study of In-Cylinder Cleaning Technologies for Medium Speed Diesel Engines Tianhao Yang, Dalian University of Technology, China
	6	Controls & Automation	50 Energy Management Controller Design for Hybrid Ship Propulsion During Transient Operation Sotiris Topaloglou, National Technical University of Athens, Greece
			55 Application Research of Neural Network Control on Diesel Guofeng Zhao, Harbin Engineering University, China
	5	Components & Tribology	23 Studies on Tribology to Reduce Friction, Wear and Lubricating Oil Consumption for Internal Combustion Engines Mitsuhiro Soejima, Kyushu Sangyo University, Japan
			295 Friction Investigations on Locally Microstructured Cylinder Liner Surfaces using a Floating-Liner Measurement System Henning Pasligh, Institut für Technische Verbrennung Hannover, Germany

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TECHNICAL PROGRAMME WEDNESDAY

Day	Finlandia Hall	Wärtsilä Hall (Helsinki Hall)	MTU Hall (Terrace Hall)	AVL Hall (Veranda 4)
Wednesday June 8, 2016	1 Product Development – Diesel Engines 1-5 Field Experience	11 Users' Aspects, Maintenance & Monitoring – Marine Applications 11-1 Tribology and Cylinder Oil	7 Exhaust Gas Aftertreatment 7-2 NOx Reduction – Low Speed	11 Users' Aspects, Maintenance & Monitoring – Marine Applications 11-3 From field experience back to Engineering / Training
09:00 – 10:30	<p>Chair: Rune Nordrik, Rolls-Royce Marine, Norway Co-chair: Matti Vaarasto, Wärtsilä, Finland</p> <p>99 Operation experience of world's first methanol engine in a ferry installation Toni Stojcevski, Wärtsilä Corporation, Sweden</p> <p>309 EPA Tier 4 and IMO Tier 3 Development & Field Experience at GE Rob Mischler, GE Transportation, United States</p> <p>139 Field experience of L28AHX, and development of V28AHX Hideyoshi Yamamoto, Niigata Power Systems Co. Ltd., Japan</p> <p>190 HIMSEN Engine's Solution for Engine Starting and Low Load Operation Taehyung Park, Hyundai Heavy Industries, Republic of Korea</p>	<p>Chair: Charlotte Rojgaard, Bureau Veritas, Denmark Co-chair: Prof. Seppo Niemi, University of Vaasa, Finland</p> <p>153 Cold Corrosion on MAN B&W Tier II Engines and solutions in spirit of mutual cooperation between COSTAMARE and MAN Diesel & Turbo Henrik Rolsted, MAN Diesel & Turbo, Denmark</p> <p>54 In-service monitoring of 2-stroke low speed engines with automatic on-line cylinder lubricant analyzer - A key added value for users in 2-stroke engine management Jean-Philippe Roman, Total Lubmarine, France</p> <p>291 Safe and Cost-effective Operation of Slow Speed 2-Stroke Diesel Engines with Scrape Down Oil Analysis (SDA) Steffen Bots, OELCHECK GmbH, Germany</p> <p>60 Handling cost accuracy and the analysis methods of Drain Oil Onboard Test Jörg Erdtmann, NSB Niederelbe Schiffahrtsgesellschaft mbH & Co. KG, Germany</p>	<p>Chair: Masahiko Okabe, Mitsubishi Heavy Industries, Japan Co-chair: Martti Larmi, Aalto University, Finland</p> <p>176 Development of NOx Reduction System that Combines an Oxygen Reduction Membrane with Water Mixed Fuel Kazuyuki Maeda, National Fisheries University, Japan</p> <p>111 SCR under pressure - pre-turbocharger NOx abatement for marine 2-stroke diesel engines Kristoffer Sandelin, Winterthur Gas & Diesel, Switzerland</p> <p>305 The World's First Commercialized Low Pressure SCR system on 2-Stroke Engine, DeNOx System Changseong Ryu, Doosan Engine, Republic of Korea</p> <p>172 Design of an efficient urea decomposition chamber using urea decomposition catalyst in NoNOx-LP SCR system for 2-stroke engine Mun Kyu Kim, Hyundai Heavy Industries, Republic of Korea</p>	<p>Chair: Michael Finch Pederson, Maersk, Denmark Co-chair: Jonas Åkerman, Wärtsilä, Finland</p> <p>275 Embedded Turbocharger Performance Monitoring Michael Daiber, ABB Turbo Systems, Switzerland</p> <p>294 Connectivity and Analytic Technologies to Ensure Safe and Reliable Operation of Electronic Controlled Engines Bert Ritscher, Caterpillar Motoren GmbH & Co. KG, Germany</p> <p>115 Development of Virtual Engine Rooms Simulators – a modern approach to Operator's training Gregory Sudwoj, Winterthur Gas & Diesel, Switzerland</p> <p>87 On-Board Diagnostic: The new onboard tool for Main Engine condition monitoring with special focus on Cylinder Condition Jesper Weis Fogh, MAN Diesel & Turbo, Denmark</p>
10:30 – 11:00	Coffee Break			
11:00 – 12:00	Collin Trust sponsored Keynote Speech by Harry Robertsson, Technical Director, Stena Rederi AB			
12:00 – 13:00	Lunch			

Collin Trust sponsored Keynote Speech Future Ship Design

Harry Robertsson is Technical Director of a ship-owning Company, representing a larger user of marine engines. He will start the 2016 Collin Trust lecture with an introduction focusing on the current situation of the shipping industry, and how it has been affected by the decision to go for 0.1% Sulphur in the SECA area.

Stena Rederi AB initiated in 2012 a project to find cost efficient solutions for all of their ferries, RoPaxes, RoRos, and tankers. Different fuels and scrubber solutions were evaluated technically and commercially. In parallel an intensive work has been made to increase the energy efficiency of the fleet of vessels. As an example, Ferries and RoPaxes have measuring devices installed in order to evaluate their energy efficiency performance, and provide decision support to the crew. The results to date of the cost- and energy project forms the first part of the lecture, and serves for Stena as a cornerstone to look into the future.

Mr. Robertsson will go on to give his view about the future of the industry. He will cover challenges, risks and opportunities and give views on which fuel may predominate and whether exhaust cleaning systems will solve all emission problems, or not. He will give examples of trends he foresees, such as the arrangement of modularization, enabling cost efficient construction of vessels. Other trends include control systems designed for increased safety such as avoidance of other vessels or running aground. Mr. Robertsson will conclude the lecture with how he sees the longer term future for various types of vessels and the shipping industry in general.

About Collin Trust

The Collin Trust was established in the 1990's, originally in the UK, and its purpose is the handling of a financial non-profit donation made by the Swedish late Prof. Lars Th. Collin (1925 – 2013), Gothenburg. The Trust organizes and sponsors Collin Trust Lectures, to foster education of the concerned public. This lecture is to be delivered at an international stage by a selected senior industrialist, or any person that has an international reputation on contemporary environmental issues. To present his/her own view, or an Organization's view on important developments in the field of energy/energy conversion and/or related matters.



Harry Robertsson

Technical Director

Stena Rederi AB

About Harry Robertsson

Harry Robertsson, born 1956, is the Technical Director at the shipping company Stena Rederi AB. Harry received his Master of Science in Naval Architecture and Marine Engineering at the Royal Institute of Technology in Stockholm 1982.

Prior to his present position Harry had worked for the Swedish National Maritime Authority, the shipyard "Götaverken Arendal" and the consultancy companies "MariTerm AB" and "Pelmatic Göteborg AB". As Technical Director at Stena Rederi AB Harry is very much involved in new buildings and conversion

solutions for vessels. When it comes to the latter, investigations of the alternative SECA solutions have taken much of his attention in recent years.

A distinct interest in sustainable solutions for shipping has given Harry and his team a unique competence in LNG and methanol as marine fuels, scrubber solutions and electrification of vessels. He has, together with the owner of Stena Rederi AB, been the strongest force behind the methanol adaption of the RoPax ferry Stena Germanica, which was in 2015 the first vessel in the world to run on methanol.

TECHNICAL PROGRAMME WEDNESDAY

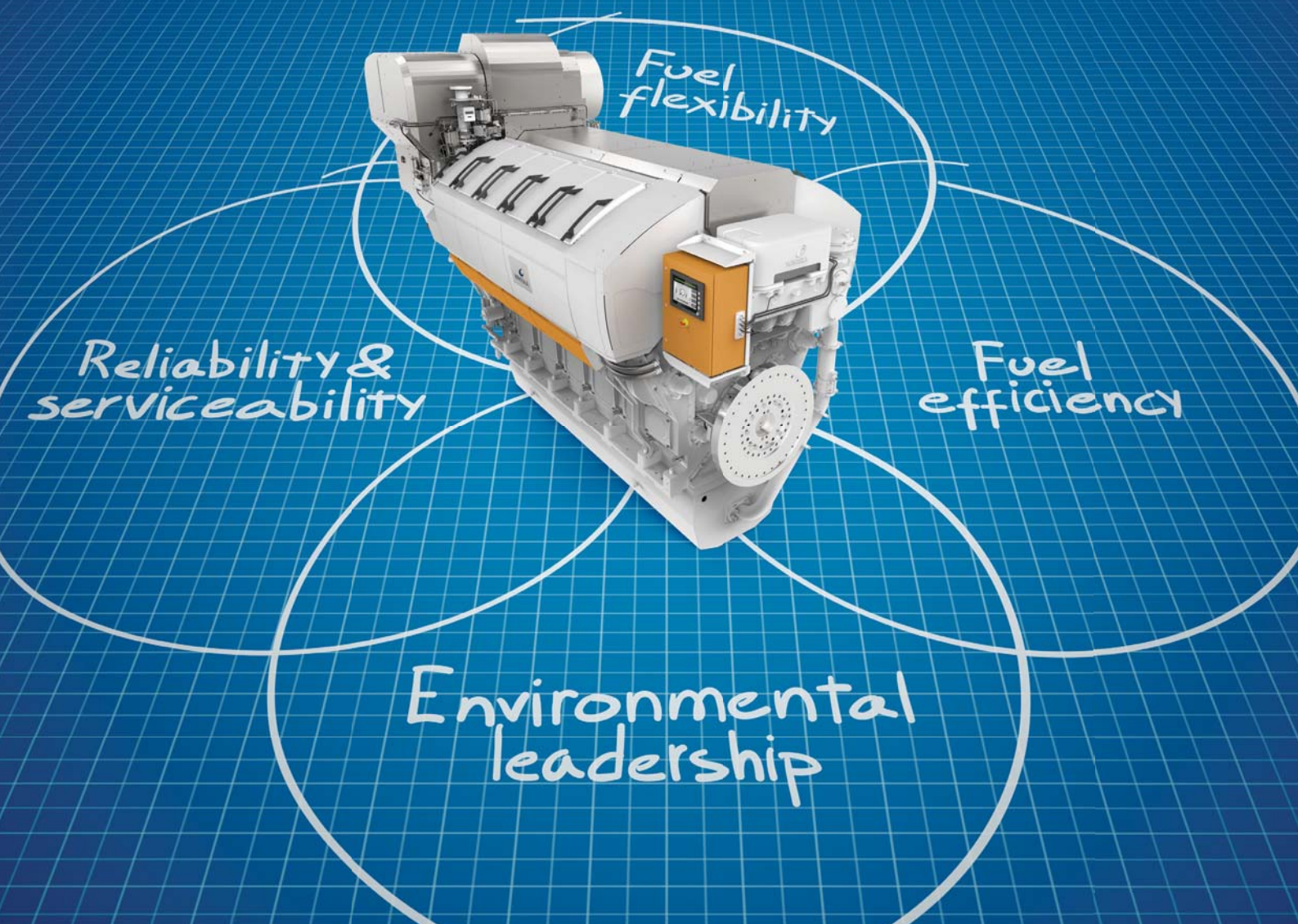
Day	Finlandia Hall	Wärtsilä Hall (Helsinki Hall)	MTU Hall (Terrace Hall)	AVL Hall (Veranda 4)
Wednesday June 8, 2016	2 Product Development – Gas & Dual Fuel Engines 2-5 Low and Medium Speed Engines & Users Aspects	11 Users' Aspects, Maintenance & Monitoring – Marine Applications 11-2 Emission Technologies and Choices	8 Basic Research & Advanced Engineering 8-8 New Systems for Emission	12 Users' Aspects, Maintenance & Monitoring – Land-based Applications 12-1 Users' Aspects, Maintenance & Monitoring – Land-based Applications
13:30 – 15:00	<p>Chair: German Weisser, ABB Turbo Systems, Switzerland Co-chair: Jaana Tamminen, Wärtsilä, Finland</p> <p>101 Performance and Emission results from the MAN B&W LGI low-speed engine operating on Methanol Stefan Mayer, MAN Diesel & Turbo, Denmark</p> <p>233 The 2-stroke Low-Pressure Dual-Fuel Technology: From Concept to Reality Marcel Ott, Winterthur Gas & Diesel, Switzerland</p> <p>269 Service Experience With the First MAN B&W Diesel ME-GI Engines Onboard LNG Vessels Lars Ryberg Juliussen, MAN Diesel & Turbo, Denmark</p> <p>236 The New ACD Medium Speed Gas & Dual Fuel Marine Propulsion Engine Gareth Estebanez, AVL List GmbH, Austria</p>	<p>Chair: Paolo Tonon, Maersk, Denmark Co-chair: Kati Lehtoranta, VTT Technical Research Centre of Finland</p> <p>134 Choice of Tier III technologies – Ship owners' viewpoints Christer Wik, Wärtsilä Corporation, Finland</p> <p>62 The Engine Users and the Implications of IMO Tier III Coming into Force Jörg Erdtmann, NSB Niederelbe Schifffahrtsgesellschaft mbH & Co. KG, Germany</p> <p>286 Experience From the World's First Ethane-Powered Multi-Gas Carrier Grant Gassner, Wärtsilä Corporation, Finland</p> <p>34 Service Experience of MAN B&W Two Stroke Diesel Engines Stig Baungaard Jakobsen, MAN Diesel & Turbo, Denmark</p>	<p>Chair: Hanne Hostrup Poulsen, MAN Diesel & Turbo, Germany Co-chair: Diego Delneri, Wärtsilä, Finland</p> <p>248 Combination of EGR and Fuel-Water Emulsions for Simultaneous NOx and Soot Reduction in a Medium Speed Diesel Engine Panagiotis Kyrtatos, Swiss Federal Institute of Technology, Switzerland</p> <p>58 Zero NOx emission in large-bore medium-speed engines with exhaust gas recirculation Matteo Imperato, Aalto University, Finland</p> <p>68 Black carbon measurements using different marine fuels Päivi Aakko-Saksa, VTT Technical Research Centre of Finland Ltd., Finland</p> <p>130 Method for Analyzing Prechamber NOx Emissions from Large Gas Engines Gerhard Pirker, LEC GmbH, Austria</p>	<p>Chair: Tim Callahan, Southwest Research Institute, United States Co-chair: Jonatan Rösgren, Wärtsilä, Finland</p> <p>71 Prognosis Performance of a Diagnosis System for Low Speed Two Stroke Diesel Engines Francisco Jimenez Espadafor, Seville University, Spain</p> <p>74 Support Scheme in Collaboration with Manufacturers Making Use of the Diagnostic Platform Based on Big Data Analysis Takashi Fujii, Diesel United Ltd., Japan</p> <p>150 Operational experience and new development for high performance of Kawasaki Green Gas Engine Yoshishige Sakai, Kawasaki Heavy Industries, Japan</p> <p>85 Lean burn engines – the optimal power source for energy solutions Mikael Wideskog, Wärtsilä Corporation, Finland</p>
15:00 – 15:30	Coffee Break			

Day	Finlandia Hall	Wärtsilä Hall (Helsinki Hall)	MTU Hall (Terrace Hall)	AVL Hall (Veranda 4)
Wednesday June 8, 2016	10 Fuels, Lubricants & Fluid Technologies 10-2 New Fuels I 15:30 – 17:00 Chair: Kjeld Aabo, MAN Diesel & Turbo, Denmark Co-chair: Katriona Sirviö, University of Vaasa, Finland 91 Visual study on combustion for development of alternative liquid and gas fuels Koji Takasaki, Kyushu University, Japan 84 Hydrogen as fuel for Wärtsilä gas engines Kaj Portin, Wärtsilä Corporation, Finland 132 Feasibility and Environmental Impact of Alternative Fuels for Shipping Christos Chryssakis, DNV GL, Norway 249 A Study on Flame Temperature and Soot Production Characteristics of FAME Mixed Diesel Oil Akihiko Azetsu, Tokai University, Japan	4 Turbochargers & Air/ Exhaust Management 4-3 Technologies and Applications Chair: Allan-Quing Zhou Wang, ABB Turbo Systems, Switzerland Co-chair: Jenni Pippuri, VTT Technical Research Centre of Finland, Finland 290 Turbocharging System Optimization for Kolomna D500 Newly Designed Engine Platform Pierre Jacoby, ABB Turbo Systems, Switzerland 106 Challenge of Environmentally-friendly Low Emission System to Tier 3 for Two Stroke Diesel Engines Masanori Higashida, Kawasaki Heavy Industries, Japan 308 Unsteady Flow Pulses Interaction with a Turbine Yuri A. Grishin, Bauman Moscow Technical University, Russia	Users Reception	7 Exhaust Gas Aftertreatment 7-1 NOx Reduction – Medium Speed Chair: Klaus Heim, OMT, Italy Co-chair: Kati Lehtoranta, VTT Technical Research Centre of Finland, Finland 243 Optimization of NOx-Emission Reduction in Medium-Speed Marine Diesel Engines with SCR-Catalyst Sun Shaowei, Technical University Braunschweig Institute of Internal Combustion Engines, Germany 97 Development of exhaust gas aftertreatment systems applied to modern high efficiency four-stroke medium-speed engines Heikki Korpi, Wärtsilä Corporation, Finland 26 The MAN SCR System – More Than Just Fulfilling IMO Tier III Andreas Döring, MAN Diesel & Turbo, Germany 204 Wärtsilä SCR development and experience for IMO Tier III Jan Torkulla, Wärtsilä Corporation, Finland
17:00	Users Reception open to all			

POSTER SESSION WEDNESDAY

Day	Balcony 3rd floor	
Wednesday June 8, 2016 09:00 – 17:00	2 Product Development – Gas & Dual Fuel Engines	271 MAN Gas Engine Safety – Handling Technical and Regulatory Challenges from Part to Plant Hans-Philipp Walther, MAN Diesel & Turbo, Germany
		100 Front-loaded R&D process for high quality – development case Wärtsilä 31 Jaana Tamminen, Wärtsilä Corporation, Finland
		259 Novel Pre-Combustion Chamber Technology for Large Bore Natural Gas Engines Luigi Tozzi, Prometheus Applied Technologies LLC, United States
		145 Optimization of Gas Injection in Marine Natural Gas Engine Liping Yang, Harbin Engineering University, China
		48 Introduction of Liquid and Gas Dual Fueled Gas Turbine System for Standby Generator Set Masamichi Koyama, Niigata Power Systems Co. Ltd., Japan
		226 Demanding icebreaking - LNG-powered icebreaking features the industry's most advanced technology Magnus Kronholm, Wärtsilä Corporation, Finland
	7 Exhaust Gas Aftertreatment	64 Performance Investigation on New Developed Maritime SCR Catalysts for Medium Speed Engine Jinhee Koo, STX Engine Co.LTD., Republic of Korea
		107 Imitating emission matrix of large natural gas engine opens new possibilities for catalyst studies in engine laboratory Timo Murtonen, VTT Technical Research Centre of Finland Ltd., Finland
		187 Optimized performance, design and manufacturing of compact silencer system for engine exhaust noise Sami Oksanen, Wärtsilä Corporation, Finland

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TECHNICAL PROGRAMME THURSDAY

Day	Finlandia Hall	Wärtsilä Hall (Helsinki Hall)	MTU Hall (Terrace Hall)	AVL Hall (Veranda 4)
Thursday June 9, 2016	2 Product Development – Gas & Dual Fuel Engines 2-3 Medium Speed Engines I	9 System Integration & Optimization 9-1 Ship, System and Component Design	3 Fuel Injection & Gas Admission 3-3 Diesel Applications	10 Fuels, Lubricants & Fluid Technologies 10-1 Traditional Fuels
08:30 – 10:00	Chair: Diego Delneri, Wärtsilä Corporation, Finland Co-chair: Olli Rantanen, Parker Hannifin, Finland 251 New DF Engine Portfolio (Wärtsilä 4-Stroke) Petri Aaltonen, Wärtsilä Corporation, Finland 86 Latest development of Large Gas Engine (MD36G) Kento Mayuzumi, Mitsui Engineering & Shipbuilding Co. Ltd., Japan 159 Development of Kawasaki Green Gas Engine for marine, L30KG series Yosuke Nonaka, Kawasaki Heavy Industries, Japan 47 Dual Fuel Engine optimized for marine applications Andreas Banck, Caterpillar Motoren GmbH & Co. KG, Germany	Chair: Patrick Frigge, GE, Austria Co-chair: Jouko Salo, Auramarine, Finland 264 Integration of Propulsion System From the Point of View of Efficiency Optimization Elias Boletis, Wärtsilä Corporation, Netherlands 177 Assessment of LNG Carriers electric propulsion configurations via process modelling George Dimopoulos, DNV GL, Greece 199 Waste heat recovery solution for marine applications Michael Sturm, Caterpillar Motoren GmbH & Co. KG, Germany 298 Further Opportunities for Flexible Engines and their Generators Nicholas Bellamy, SSS Gears Limited, United Kingdom	Chair: Andrei Ludu, AVL List GmbH, Austria Co-chair: Jukka Kijärvi, University of Vaasa, Finland 253 Comparative Investigations of Spray Formation, Ignition and Combustion for LFO and HFO at Conditions relevant for Large 2-Stroke Marine Diesel Engine Combustion Systems Beat von Rotz, Winterthur Gas & Diesel, Switzerland 30 The challenge of EU Stage 5 emissions. Are current injection systems sufficient for future large engine emission limits? Christoph Kendlbacher, Robert Bosch AG, Austria 79 Investigation of cavitation in injection nozzles for two-stroke Diesel engines Simon Matlok, MAN Diesel & Turbo, Denmark 217 Internal diesel injector deposits – Causes and measures with the focus on marine engine applications and fuels Christian Fink, University of Rostock, Germany	Chair: Hans-Joachim Götze, DNV GL, Germany Co-chair: Tarmo Mäkelä, Parker Hannifin Corporation, Finland 41 The Effect of Renewable Paraffinnic Diesel Oil on Engine Performance / NESTE NEXBTL Toomas Karhu, Turku University of Applied Sciences, Finland 123 The Effect of Boil off on the Knock Resistance of LNG Gases Martijn van Essen, DNV GL, Netherlands 297 Depth-type Filtration Technology - Absolute Protection from Cat Fines in Marine Residual Fuel Albert Leyson, Drew Marine, United States 240 From the Lab to the Field, how new chemistry can solve the operating issues of 2-stroke engines transiting ECA zones Valérie Doyen, TOTAL Marketing & Services - Centre de Recherches de Solaize, France
10:00 – 10:30	Coffee Break			

Day	Finlandia Hall	Wärtsilä Hall (Helsinki Hall)	MTU Hall (Terrace Hall)	AVL Hall (Veranda 4)
Thursday June 9, 2016	2 Product Development – Gas & Dual Fuel Engines	9 System Integration & Optimization	3 Fuel Injection & Gas Admission	10 Fuels, Lubricants & Fluid Technologies
	2-4 Medium Speed Engines III	9-2 Integration Methodologies	3-4 Gas Applications II	10-5 Lube Oil Technology II
10:30 – 12:00	<p>Chair: Karl Wojcik, AVL List GmbH, Austria Co-chair: Jaana Tamminen, Wärtsilä, Finland</p> <p>201 Development of HiMSEN Dual Fuel Engine Line-up Wookhyeon Yoon, Hyundai Heavy Industries, Republic of Korea</p> <p>214 GE Transportation Dual Fuel Locomotive Development Eric Dillen, GE Transportation, United States</p> <p>82 Fuel sharing for Wärtsilä gas engines Kenneth Widell, Wärtsilä Corporation, Finland</p> <p>146 Development of Dual Fuel Engine 28AHX-DF Capable of FPP Direct Drive Tetsuya Tagai, Niigata Power Systems Co. Ltd., Japan</p>	<p>Chair: Elias Boletis, Wärtsilä Corporation, Netherlands Co-chair: Kalevi Huhtala, Tampere University of Technology, Finland</p> <p>311 Operating Cost Optimized Engine and Aftertreatment Concepts for Marine Applications Udo Schlemmer-Kellig, FEV GmbH, Germany</p> <p>310 Energy Saving Technologies and New Analysis Methods in Cargo Ship Machinery Design Mia Elg, Deltamarin, Finland</p> <p>219 Simulation-Based Approach for Customer-Specific Optimal Solution Design Kalevi Tervo, ABB Marine, Finland</p> <p>202 Simulation of a Hybrid Marine Propulsion System in Waves Kevin Koosup Yum, Norwegian University of Science and Technology, Norway</p>	<p>Chair: Albertus Dijks, Gasunie, Netherlands Co-chair: Jari Hyvönen, Wärtsilä, Finland</p> <p>168 Development of Mitsui High-Pressure Compressor for Fuel Gas Supply System of ME-GI engine Kouichi Namba, Mitsui Engineering & Shipbuilding Co. Ltd., Japan</p> <p>162 Methane Slip Reduction from Marine Gas Engines by Stratified Oxygen Concentration using Gas Permeation Membrane Hiroshi Tajima, Kyushu University, Japan</p> <p>207 Study on Mixture Formation Process in Two Stroke Low Speed Premixed Gas Fueled Engine Takahiro Kuge, IHI Corporation, Japan</p> <p>170 Impact of Different Combustion Methods on Performance and Exhaust Gas Composition of Natural Gas Engines Yoshitane Takashima, Osaka gas, Japan</p>	<p>Chair: Kimihiko Sugiura, MAN Diesel & Turbo, Japan Co-chair: Kai Juoperi, Wärtsilä, Finland</p> <p>241 Lubricant Development Tools for Modern Trunk Piston Engine Oils Jose Luis Garcia, Shell Global Solutions GmbH, Germany</p> <p>73 Cylinder Lube Oil Experiences and New Development for the MAN B&W Two-stroke Engines Dorthe M.S. Jacobsen, MAN Diesel & Turbo, Denmark</p> <p>143 Development of Cylinder Lubricant for LNG-fuelled 2-stroke Engines Shigeki Takeshima, JX Nippon Oil & Energy Corporation, Japan</p> <p>45 Advanced filtration of lubrication oil for the hydraulic system in 2-stroke engines Stefan Schmitz, Boll&Kirch Filterbau GmbH, Germany</p>
12:00 – 13:00	Lunch			

TECHNICAL PROGRAMME THURSDAY

Day	Finlandia Hall	Wärtsilä Hall (Helsinki Hall)	MTU Hall (Terrace Hall)	AVL Hall (Veranda 4)
Thursday June 9, 2016	10 Fuels, Lubricants & Fluid Technologies 10-3 New Fuels II	9 System Integration & Optimization 9-3 Ship Related Issues	7 Exhaust Gas Aftertreatment 7-3 SOx, Particulates and Classification	8 Basic Research & Advanced Engineering 8-7 New Measurements
13:00 – 14:30	<p>Chair: Masaki Ohtsu, Mitsui Engineering & Shipbuilding Co. Ltd., Japan Co-chair: Kalle Lehto, Neste Corporation, Finland</p> <p>16 B5 Biodiesel Fuel for Locomotives in the U.S. Steven Fritz, Southwest Research Institute, United States</p> <p>29 Performance and emissions of a common-rail non-road diesel engine driven with different renewable fuels Seppo Niemi, University of Vaasa, Finland</p> <p>238 Alternative fuels from a medium-speed engine manufacturer's perspective Kai Juoperi, Wärtsilä Corporation, Finland</p> <p>89 Impacts of Minor Components on Knock Tendency of Methane-based Fuels Hiroki Tanaka, Osaka Gas, Japan</p>	<p>Chair: Hinrich Mohr, AVL List GmbH, Germany Co-chair: Kalevi Huhtala, Tampere University of Technology, Finland</p> <p>103 SOLAS new noise regulation impact on engine noise reduction and engine room Zengxin Gao, Wärtsilä Corporation, Finland</p> <p>28 Experimental and numerical vibration study into hydraulic top bracings' influence on engine and superstructure vibration Michael Holtmann, DNV GL, Germany</p> <p>129 Ship Engine In-Service Performance Management, Using a State-of-Art Model-Based Assessment Methodology Panos Theodossopoulos, Propulsion Analytics, Greece</p> <p>289 OHS – Noise Reduction in Engine Rooms onboard Ships Marius Banica, ABB Turbo Systems, Switzerland</p> <p>322 E-drive – An Integrated System Approach for Ships: Concepts and Verification Stefan Müller, MTU Friedrichshafen, Germany</p>	<p>Chair: Göran Hellén, Wärtsilä Corporation, Finland Co-chair: Päivi Aakko-Saksa, VTT Technical Research Centre of Finland, Finland</p> <p>160 Marine Diesel Engines with SCR: Class Societies' Best Practices Fabian Kock, DNV GL, China</p> <p>247 A regulatory outlook for PM / BC emissions for shipping Torsten Mundt, DNV GL, Germany</p> <p>221 Detailed analysis of PM emissions from a medium speed diesel engine as a precondition for successful application of DPF Bert Buchholz, FVTR GmbH, Germany</p> <p>210 Development of Dry Scrubber Technology: New Absorbent Technologies for Two and Four Stroke Applications Robert Bank, FVTR GmbH, Germany</p>	<p>Chair: Christer Wik, Wärtsilä Corporation, Finland Co-chair: Kati Lehtoranta, VTT Technical Research Centre of Finland, Finland</p> <p>205 Study on the measurement method and characteristics of particulate matter from marine diesel engines Hidetsugu Sasaki, Tokyo University of Marine Science and Technology, Japan</p> <p>110 Particulate and special emission measurement – methods and needs for the future Juha Heikkilä, Wärtsilä Corporation, Finland</p> <p>165 Impact of sampling conditions and procedure on particulate matter emissions from a marine diesel engine Leonidas Ntziachristos, Tampere University of Technology, Finland</p> <p>258 Effect of Fuel Composition on its Ignition and Combustion Quality Chiori Takahashi, National Maritime Research Institute, Japan</p>
14:30 – 15:00	Coffee Break			
15:00 – 16:30	<p>Final Panel Discussion: The Lowest Oil Price in a Decade – a Game Changer for Ship Operators and Engine Makers? Chair: Axel Kettmann, ABB Turbocharging, CIMAC Vice-President Communications</p>			
19:00	Gala Dinner at Cable Factory, Helsinki			

POSTER SESSION THURSDAY

Day	Balcony 3rd floor		
Thursday June 9, 2016 08:30 – 17:00	3	Fuel Injection & Gas Admission	279 New HEINZMANN High Performance Actuator Family for Diesel-, Gas-, and Dual-Fuel Engines Philipp Tritschler, Heinzmann GmbH & Co KG, Germany
			42 Analysis and Testing the Impact of Large Volumes of Water in Diesel Fuel Oil Arthur Killinger, MPR Associates Inc., United States
			63 New Common Rail Injector and Engine Application Performances Kilian Zimmermann, Ganser CRS AG, Switzerland
			122 Large Engines System approach for Diesel, Gas and Dual Fuel Engines Anton Brandstätter, Robert Bosch GmbH, Germany
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TECHNICAL TOURS **JUNE 10, 2016**

TOUR DATE: JUNE 10, 2016

Arctic Tour

Finland is an Arctic country

Roughly a third of Finland lies north of the Arctic Circle. Finland is the northernmost country on the European continent, and in winter all its ports can be icebound. The Finnish foreign trade relies heavily on sea transportation. Therefore, strong competencies, innovative products, and services that meet the demands of its challenging winter climate have been developed. The Arctic Tour presents companies with core competencies in Arctic maritime technologies and services:

- Aker Arctic
- ABB Marine and Port
- Arctia
- Arctech Helsinki Shipyard
- Wärtsilä



Price: € 200* per person
Time: 09:00 – 16:00 h
Departure: Finlandia Hall
Participants: Min. 25 persons / Max. 50 persons

TOUR DATE: JUNE 10, 2016

Fuel Tour

Finland is a forerunner in sustainable fuels

Finnish companies have taken a leading position in the development and use of environmentally sustainable fuels that comply with the most stringent EU quality standards and specifications. With a strong emphasis on renewable energy sources and the development of technologies enabling greater use of clean natural gas, Finland is playing an important role in reducing emissions from ships, power plants and vehicular traffic. The Fuel Tour will visit leading company facilities in this field:

- Neste Refinery
- Neste Jacobs
- Lamor



The tour includes a Wärtsilä LNG terminal presentation.

Price: € 200* per person
Time: 09:00 – 16:00 h
Departure: Finlandia Hall
Participants: Min. 25 persons / Max. 50 persons

TOUR DATE: JUNE 10, 2016

Research & Competence Tour

Finland has world-class competencies

The international success of Finnish companies in the technology sector is based on innovation and the readiness to adopt the latest technologies and concepts. This strong know-how and dedication to continuous development has given Finland global recognition in the internal combustion engine field, among others. Strategic cooperation between companies and research institutes has been the basis for building this world-class competence.

The Research & Innovation Tour takes you to the Aalto University with visits to the following units:

- Aalto University Engine Laboratory
- Industrial Internet Campus
- Aalto Design Factory

Aalto University is a multidisciplinary scientific and arts community working in the fields of technology, business and art. In addition to excellence in education, research and artistic activities, Aalto aims to have a major impact on society.

The Tour also includes visits to:

- VTT Technical Research Centre of Finland Engine Laboratory
- Wärtsilä Propulsion Test Centre

Price: € 200* per person
Time: 09:00 – 16:00 h
Departure: Finlandia Hall
Participants: Min. 25 persons / Max. 100 persons

TOUR DATE: JUNE 10, 2016

The Roots of Industry in Finland

The Tour will go to [Fiskars Village](#), [SBA Interior](#) and [Svartå Manor](#). Fiskars Ironworks was founded in 1649 to manufacture cast iron and forged products. Today, Fiskars Corporation is an international company whose operations are consumer-centered and grow through strong specialist brands for home, garden and outdoors renowned for their functionality and cutting-edge design.

Svartå Manor is one of the most illustrious manor houses in Finland with a history of more than 200 years.

The tour includes a visit to SBA Interior. SBA is specialised in classified non-combustible accommodation panelling and different types of beds for use on board ships. Another branch of SBA is subcontracting for the metal industry, i.e. making different components in sheet metal with high performance punching and laser cutting machines.



Price: € 200* per person
Time: 08:30 – 17:00 h
Departure: Finlandia Hall
Participants: Min. 25 persons / Max. 50 persons

OPTIONAL TOURS JUNE 7 – 9, 2016

TOUR DATES: JUNE 7 – 9, 2016

Fork in Hand – Culinary Walk in Helsinki

Listen to stories about Helsinki and Finnish food as you enjoy tasting on the go. Meet local vendors and café owners and hear their stories. Experience the culinary Helsinki from the largest food hall in the city to the smallest local deli, visit the market hall and the market square, etc.



Price: € 100* per person
Time: 09:00 – 13:00 h
Departure: Finlandia Hall
Participants: Min. 10 persons / Max. 16 persons
Including: Taste samples, beer tasting menu and coffee

TOUR DATES: JUNE 7, 2016 AND JUNE 9, 2016

Visit to Suomenlinna Sea Fortress, Helsinki

The sea fortress Suomenlinna is an impressive witness to Finnish history. It is listed among the UNESCO World Heritage sites. From the boat you are able to see Helsinki from the sea and get a view of the coastal archipelago. During your stay at Suomenlinna you will get to know the museum fortress on a guided 1.5 h tour.



Price: € 80* per person
Time: 12:00 – 16:30 h
Departure: Finlandia Hall
Participants: Min. 30 persons / Max. 100 persons
Including: Lunch

TOUR DATES: JUNE 7 – 9, 2016

Design Brand Store Visits, Helsinki

Are you interested in design? The most famous Finnish design brands Iittala and Marimekko warmly welcome you to a special visit to learn about their brands. You will get a discount coupon of 15% for each store. Lunch will be served in a restaurant with a unique location by the rapids of the Vantaa river.



Price: € 80* per person
Time: 09:00 – 14:00 h
Departure: Finlandia Hall
Participants: Min. 12 persons / Max. 32 persons
Including: Lunch

TOUR DATES: JUNE 7, 2016 AND JUNE 9, 2016

Music City Walk, Helsinki

This guided city walk will take you through the main sights of Helsinki while listening to some of the best music Finland has to offer. Your guide will give you insights into Helsinki as well as a selection of amazing music from Finland. You may dance on the way and sing along or simply enjoy the music quietly.

Price: € 80* per person
Time: 09:00 – 13:00 h
Departure: Finlandia Hall
Participants: Min. 5 persons / Max. 20 persons
Including: Lunch



TOUR DATES: JUNE 8, 2016

Bike Tour in Helsinki

On this entertaining bicycle tour, you will learn what the Helsinki area is all about. We follow the western coastline of the city from island to island to places where you have access only by bike. The trail features numerous attractive parks and green forest areas.

You will be equipped with helmet and a comfortable Pony bike with back pedal, foot break and hand break. The tour length is 17 km.

Price: € 100* per person
Time: 09:00 – 14:00 h
Departure: Finlandia Hall
Participants: Min. 5 persons / Max. 100 persons
Including: Lunch



Tour Operator of the Optional Tours
(except Morning Jogging):

Skafur-Tour
Vaskisepäntie 5C
FI-00620 Helsinki
<http://skafur-tour.fi>



MORNING JOGGING

Enjoy an active start to the Congress Day!

In the mornings guided jogging tours will be available for your convenience from selected Congress hotels. You are expected to bring your own running gear, but a complimentary CIMAC T-shirt will be provided. Morning jogging tours will be offered from June 7 – 9, 2016.

OPTIONAL TOURS **JUNE 8, 2016**

TOUR DATE: JUNE 8, 2016

Dinner Cruise by a Sailing Ship

Evening sailing onboard a traditional sailing ship outside Helsinki offers you an opportunity to get fresh sea air and a touch of nostalgia. The ship has three masts, and it is one of the last original wooden sailing ships. You can admire the sea view, socialise and enjoy a two-course meal in the cabin. After the meal drinks are available for purchase from the deck bar.

Price:	€ 130* per person	* All prices include VAT
Time:	18:00 – 22:00 h	
Departure:	Halkolaituri (Pohjoisranta) – See map of Helsinki page 50	
Participants:	Min. 55 persons / Max. 100 persons	
Including:	Two-course buffet dinner with fish, meat and vegetarian options	
Drinks:	Two glasses of wine or beer included	



TOUR DATE: JUNE 8, 2016

Evening Tour to Nuuksio National Park

A short hiking tour after a long conference day makes you feel good. The tour takes you to Nuuksio National Park to experience the beauty of typical Finnish nature. After having enjoyed the smoke sauna, and maybe a short swim in a cold lake, you feel even better, and your day is perfectly rounded off by a dinner of Finnish delicacies served in a forest restaurant.

Price:	€ 130* per person	* All prices include VAT
Time:	18:00 – 22:00 h	
Departure:	Kiasma bus stop in the city centre – See map of Helsinki page 50	
Participants:	Min. 30 persons / Max. 100 persons	
Including:	Sausage or corn snack after hiking, two-course dinner after sauna	
Drinks:	Two glasses of wine or beer included	



OPTIONAL TOURS JUNE 7 – 9, 2016

TOUR DATES: JUNE 7 – 9, 2016

Morning Jogging Tours

Tours will be guided by our staff. Detailed information about the jogging routes will be included in the Congress bag.

Three different types of routes:

- Helsinki city sightseeing
- Central Park of Helsinki
- Helsinki by the sea

Start points:

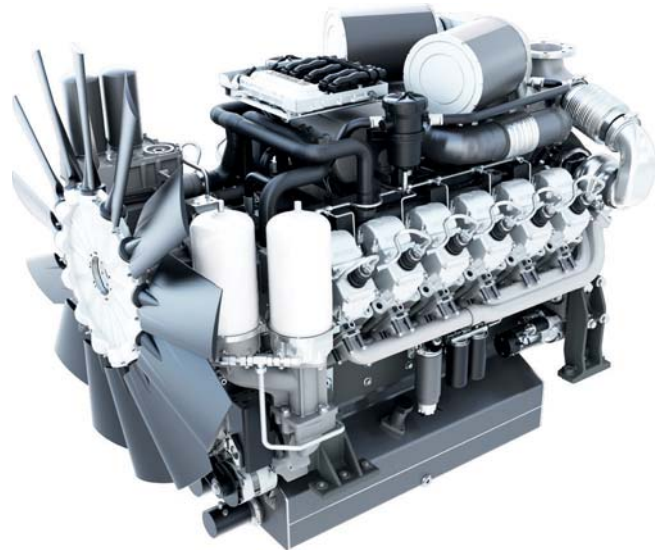
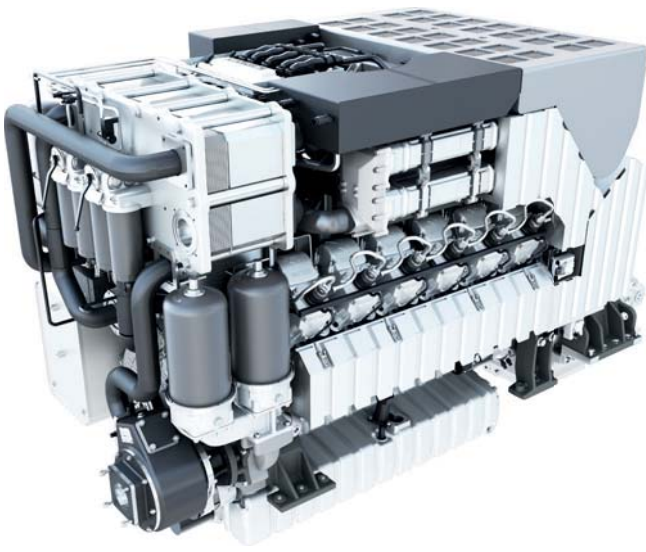
- Hotel Scandic Park/Hotel Crowne Plaza
- Hotel Holiday Inn City Centre
- Hotel Scandic Simonkenttä

Start time: 06:30 h
Duration: 30 min to 45 min
Distance: 5 km to 6.5 km

MORNING JOGGING

Enjoy an active
start to the
Congress Day!





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MTU also provides a full line of service products to help its clients maximise uptime and performance.



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00530 Helsinki, Finland

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101-0021 Tokyo, Japan



BOLL & KIRCH Filterbau GmbH
50170 Kerpen, Germany



OMT Officine Meccaniche Torino
Rivoli (TO), 10090 Italy



Caterpillar Motoren GmbH & Co. KG
24159 Kiel, Germany



Tenneco
Lake Forest, IL60045 Illinois,
United States



FEV GmbH
52078 Aachen, Germany



Robert Bosch GmbH
70469 Stuttgart, Germany



FTTI The Federation of Finnish Technology Industries
00131 Helsinki, Finland



Winterthur Gas & Diesel Ltd.
8401 Winterthur, Switzerland



GE Jenbacher GmbH & Co OG
6200 Jenbach, Austria



Woodward, Inc.
Loveland, CO80583 Colorado,
United States



Geislinger GmbH
5300 Hallwang/Salzburg, Austria



Yanmar Co., Ltd.
530-8311, Osaka, Japan



Infineum UK Ltd.
Abingdon, Oxfordshire OX13 6BB, UK

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Company		Booth
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AVL List GmbH	8020 Graz, Austria	2–3
Cast Iron Welding Services Ltd.	LE6 73FP Coalville Leicestershire, United Kingdom	2–18
Caterpillar Motoren GmbH & Co. KG	24159 Kiel, Germany	0–14
Chevron Oronite S.A.S.	92500 Rueil-Malmaison Cedex, France	2–5
Chris-Marine AB	200 39 Malmö, Sweden	0–12
Componenta Corporation Pistons	68600 Pietarsaari, Finland	0–13
Convergent Science	4040 Linz, Austria	0–23
Diesel & Gas Turbine Worldwide	53186-1873 Waukesha, United States	0–19
DUAP AG	3360 Herzogenbuchsee, Switzerland	2–6
DVV Media Group GmbH/New Ships Orderbook	20097 Hamburg, Germany	0–22
Federal-Mogul Burscheid GmbH	51399 Burscheid, Germany	0–8
FEV GmbH	52078 Aachen, Germany	0–4
Ganser CRS AG	8404 Winterthur, Switzerland	0–6
Geislinger GmbH	5300 Hallwang, Austria	2–13
Hans Jensen Lubricators A/S	9560 Hadsund, Denmark	0–5
HBM Test and Measurement	2150 Espoo, Finland	2–16
Heinzmann GmbH & Co. KG	79677 Schönau, Germany	2–12
HOERBIGER	1110 Wien, Austria	0–16
Hotstart Inc.	99212 Spokane, United States	2–14
HYDAC Technology GmbH	66280 Sulzbach /Saar, Germany	2–27
IMES GmbH	87600 Kaufbeuren, Germany	0–3
Infineum UK Ltd.	OX13 6BB Abingdon, Oxfordshire, United Kingdom	2–15
JAQUET Technology Group AG	4009 Basel, Switzerland	2–25
Kongsberg Maritime	7005 Trondheim, Norway	2–29
L'Orange GmbH	70435 Stuttgart, Germany	0–7
M. Jürgensen GmbH & Co KG	24966 Sörup, Germany	2–9

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EXHIBITORS

Company		Booth
Märkisches Werk GmbH	58553 Halver, Germany	0–10
Marine Propulsion & Auxiliary Machinery	Enfield EN1 2QN, United Kingdom	0–20
MTZIndustrial	65189 Wiesbaden, Germany	0–21
Miba Bearing Group	4663 Laakirchen, Austria	2–8
Mitsubishi Heavy Industries Marine Machinery & Engine Co. Ltd.	108-0075 Tokyo, Japan	0–9
MOTORTECH GmbH	29223 Celle, Germany	2–22
MTU Friedrichshafen GmbH	88040 Friedrichshafen, Germany	2–4
National Instruments	02630 Espoo, Finland	2–28
Nova Werke AG	8307 Effretikon, Switzerland	2–7
OELCHECK GmbH	83098 Brannenburg, Germany	2–24
OMT Officine Meccaniche Torino Spa	10090 Cascine Vica-Rivoli Torino, Italy	2–1
Parker Hannifin Manufacturing Finland Oy	31700 Urjala, Finland	2–10
PBS Turbo, s.r.o.	595 01 Velká Bíteš, Czech Republic	0–15
PETER FUCHS TECHNOLOGY GROUP AG	6362 Stansstad, Switzerland	0–11
Purso-Tools Oy, Camshafts & Conrods	28760 Pori, Finland	2–19
Ricardo UK Ltd	BN43 5FG Shoreham-by-Sea, United Kingdom	2–11
Robert Bosch GmbH	70049 Stuttgart, Germany	0–1
Sick Oy	01620 Vantaa, Finland	2–23
Sifoe	69001 Lyon, France	2–17
SKF Marine GmbH	20457 Hamburg, Germany	2–26
The Federation of Finnish Technology Industries	00130 Helsinki, Finland	2-20
TT Gaskets	33560 Tampere, Finland	2–30
VTT Technical Research Centre of Finland Ltd.	02044 VTT, Finland	0–24
WAGO Kontakttechnik GmbH & Co. KG	32423 Minden, Germany	2–21
Wärtsilä	00530 Helsinki, Finland	2–2

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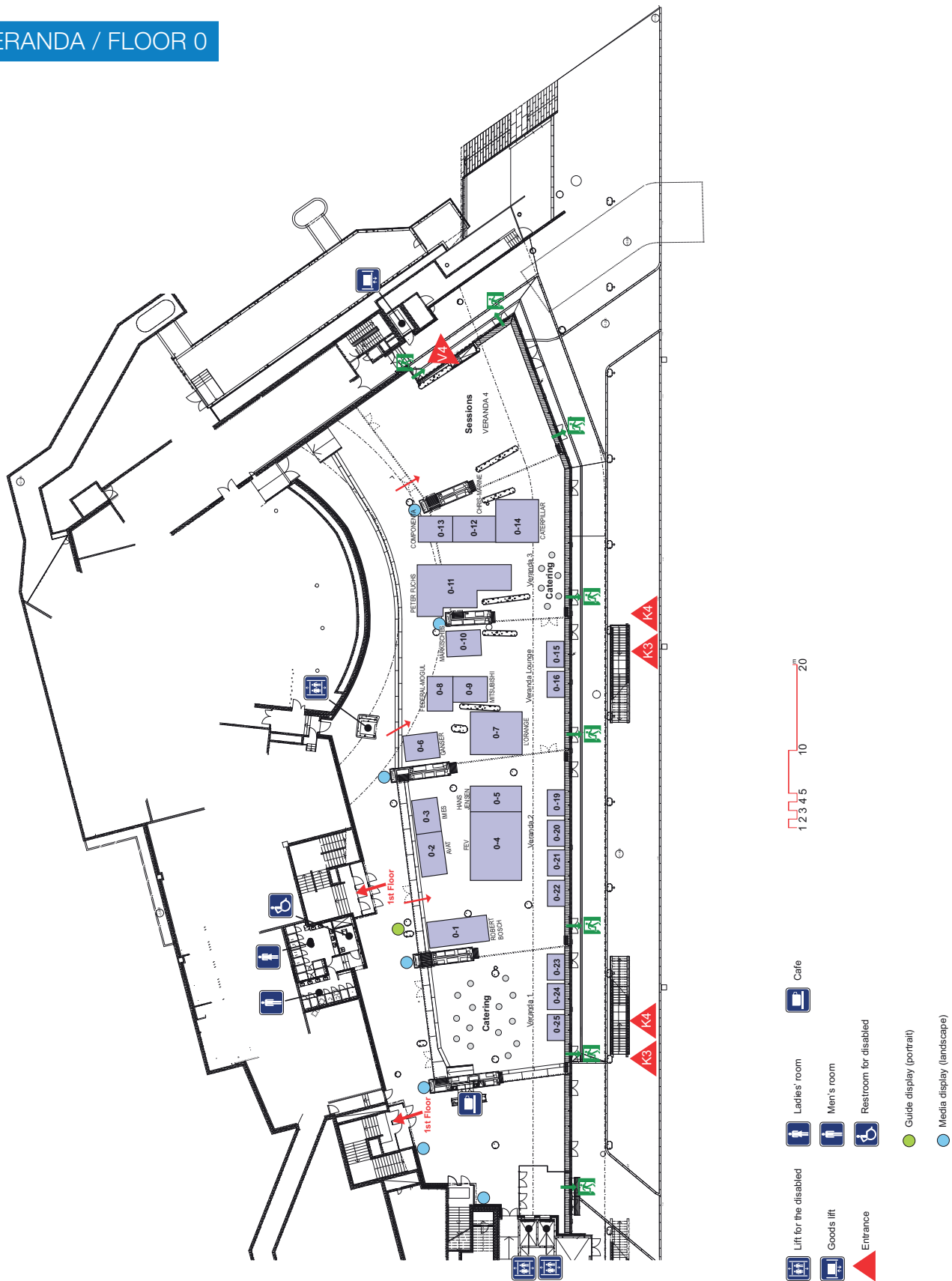
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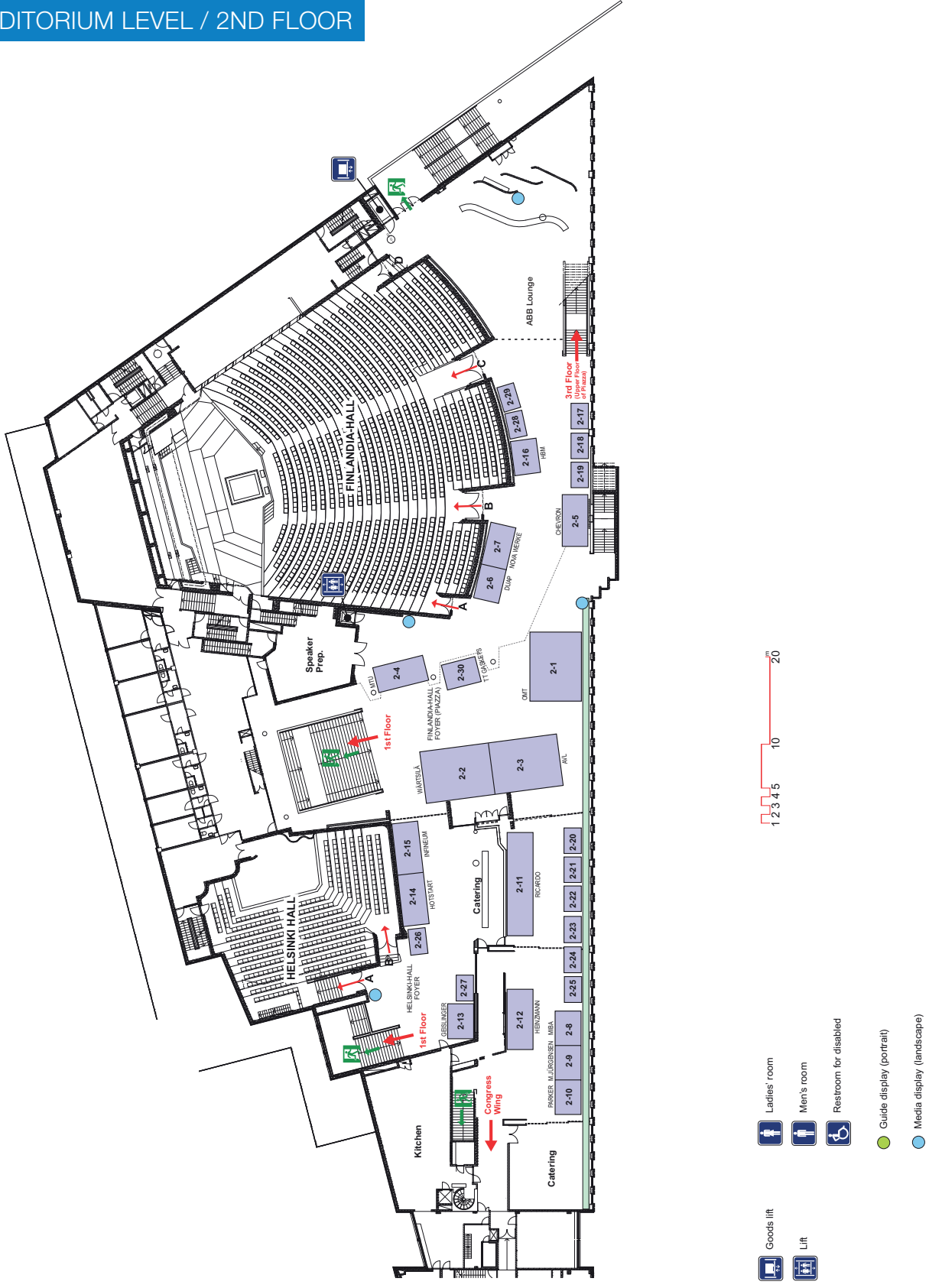
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FINLAND / HELSINKI

Finland

What makes Finland special?

One of the most remarkable features of Finland is light.

The white summer nights are perhaps Finland's most iconic natural phenomenon. The midnight sun is at its strongest during June and July, and the further north you go, the longer and higher the sun stays above the horizon. In the very northernmost parts you can experience a full midnight sun from May to August. When the endless sunshine of summer gives way to the dark winter, the Northern Lights appear like magic and lighten up the sky.

The sauna forms a significant part of the country's heritage and culture: there are over two million saunas in Finland. For a population of 5.4 million, this equals to an average of one per household.

Finland is often called the Land of a Thousand Lakes. A modest name, considering that there are 188,000 lakes in Finland. As many of these lakes are very large in size, a great part of Finland is covered with water, distinguishing Finland from other European countries.

Finland is a true design nation with world renowned designers and architects who have set trends for decades. As these Finnish design icons are still admired worldwide, a new generation of innovative young designers is also appearing.

Helsinki

What makes Helsinki special?

Helsinki, the capital of Finland, is a vibrant seaside city of beautiful islands and great green parks. Design, architecture, culture and shopping are all interesting areas to explore. Large parks, areas, forests, lakes, and the coastline with numerous islands ensure that nature is present everywhere.

The archipelago of Helsinki consists of around 330 islands, providing beautiful settings for days on the beach or weekend camping trips. Many of the islands can be reached by regular ferries from early morning until late at night.

The food culture in Helsinki today is cutting-edge and trendy, represented by pop-up restaurants, restaurant days, and street food festivals. Genuine Finnish food is local, seasonal, wild and fresh – with game, fish, mushrooms and berries at the core of it all.

For more information about Finland please visit:
www.visitfinland.com



JOURNEY

How to reach the city of Helsinki

Public transportation

- The airport has excellent connections to the whole Helsinki region. You can continue your journey from Helsinki Airport by train, bus or taxi.
- The train station is located on the arrivals floor, between terminals 1 and 2.
- Platforms for buses and coaches serving the Helsinki city centre and metropolitan area are located in front of both terminals.
- Taxis are available in front of the doors of both terminals.

Trains

The entrance to the train station is in the corridor between the terminals.

- Single tickets can be bought at the ticket machines on the platform.
- The machines only accept chip cards
- Regional ticket price: 5€.

You can also buy a Helsinki region public transport ticket from conductor on the train in the ticket sales compartment.

- In one-carriage trains, the ticket sales compartment is located in the middle of the carriage. In two-carriage trains, the ticket sales compartment is located in the middle of the rearmost carriage.
- The conductors sell the same tickets available from the ticket machines. Conductors accept the most common credit or debit cards (no Visa Electron) and cash.

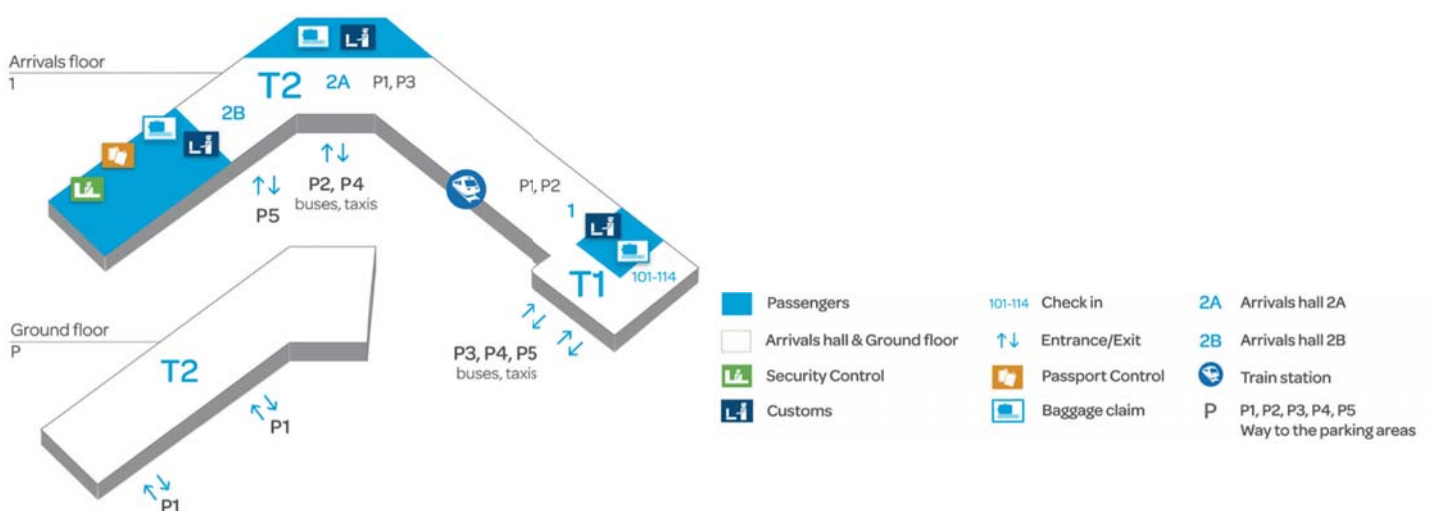
Buses

Line 615 and the **Finnair City Bus** operate between the airport and Helsinki Railway Station. The Finnair City Buses, operated by Pohjolan Liikenne, depart from the airport every 20 minutes. You can buy your ticket in the bus.

- Ticket price 6.30 €

- Finnair City Bus Schedule:
www.finnair.com/go/2016.4-61/documents/PDFs/FINNAIRAIKATAULU_1115_WEB.pdf

HELSINKI AIRPORT TERMINAL MAP



How to reach the city of Helsinki

Taxis

A journey by taxi from the airport to the centre of Helsinki takes about 30 minutes and costs around 45 to 50 euros. The taxi stands are located right outside the arrival areas of the terminals.

When does the next bus or train depart from Helsinki Airport?

- Check the timetables here:
www.finavia.fi/en/helsinki-airport/to-and-from/train-buses-and-taxis/departing-from-airport/
- More information on trains, buses and taxis:
www.finavia.fi/en/helsinki-airport/to-and-from/train-buses-and-taxis/departing-from-airport/

Car rentals

The car rentals are located in the corridor between T1 and T2.

- Airport information desk:
www.finavia.fi/en/helsinki-airport/services/travel-services/airport-information-parking/
- Car rentals and Service Station:
www.finavia.fi/en/helsinki-airport/services/parking-and-traffic/





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CONGRESS VENUE

Finlandia Hall

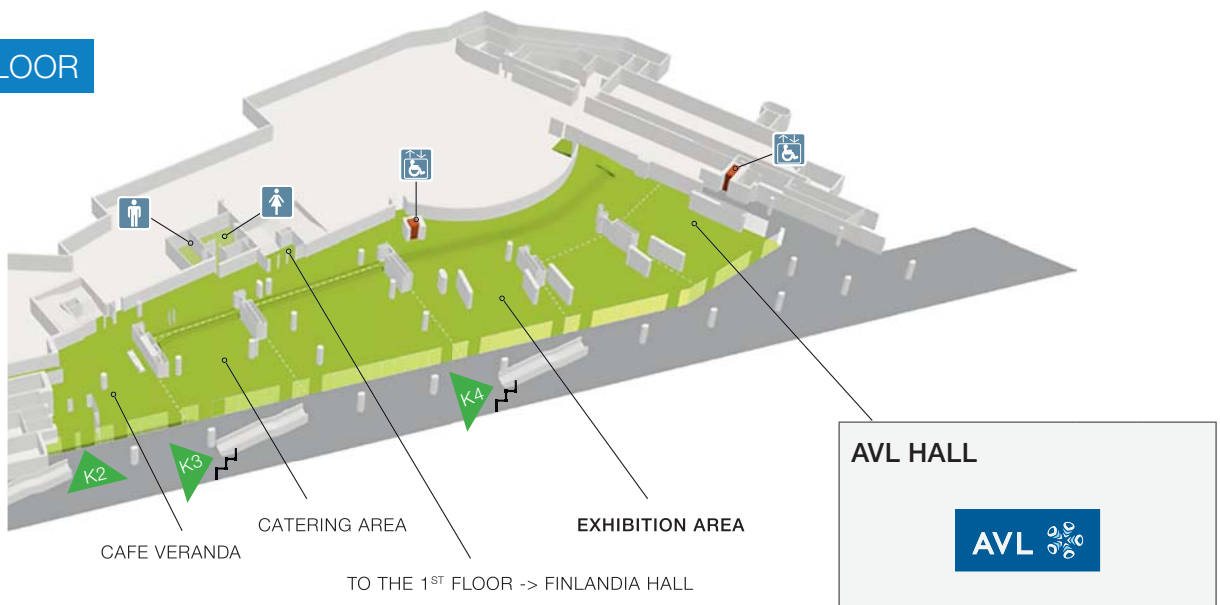
The Congress will take place at the Finlandia Hall. The Finlandia Hall is a masterpiece by the renowned Finnish architect Alvar Aalto and is worth a visit itself. Its combination of an all-embracing aesthetic vision, distinctive atmosphere and functionality is unique. The location in a park by the sea in the centre of Helsinki adds the final touch to a building which has no equivalent, neither in Finland nor anywhere else.

Congress Venue

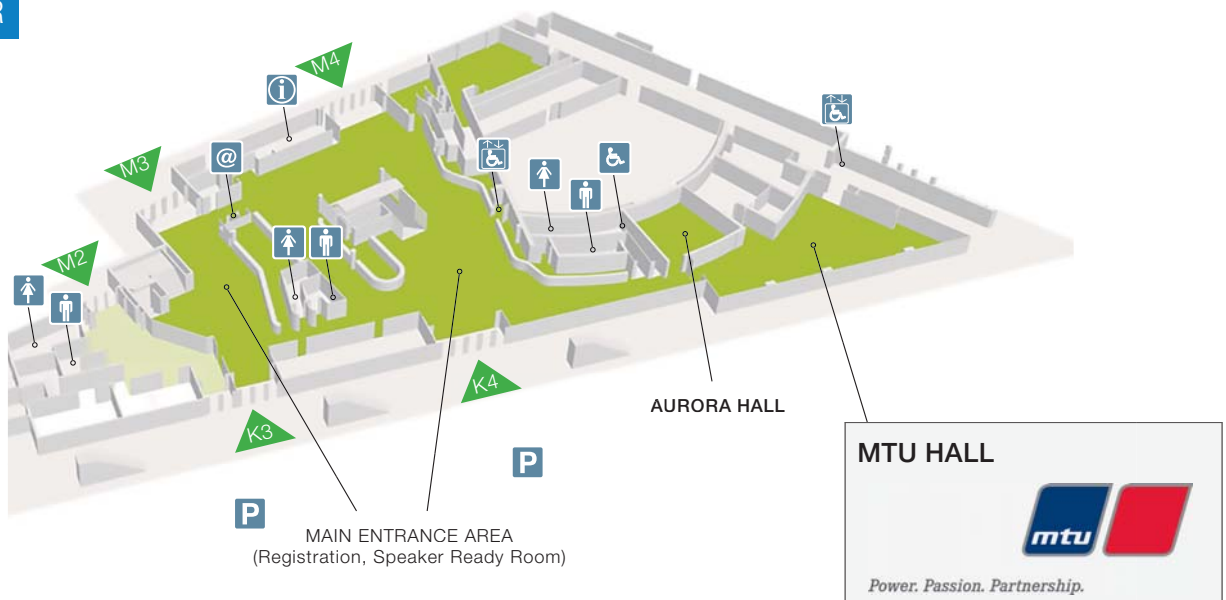
Finlandia Hall
Mannerheimintie 13 e
FI-00100 Helsinki
Finland

www.finlandiahall.fi

GROUND FLOOR



1ST FLOOR

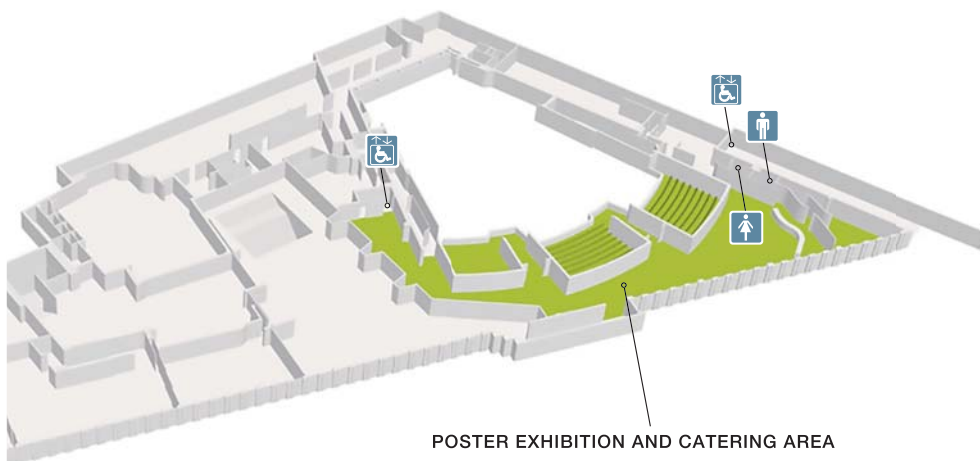




2ND FLOOR



3RD FLOOR



ACCOMMODATION

For all Congress participants special room rates (June 5–11, 2016) have been arranged in the hotels below. Please book directly in the hotel of your choice by using the booking code. We recommend an early reservation due to room limitations. All of our hotels are in the proximity of the Congress venue. For further details please use the hotel links listed below.

1

Hotel Scandic Park

Mannerheimintie 46, FI-00260 Helsinki
Tel: +358 9 47371 | Fax: +358 9 4737 2211
parkhelsinki@scandichotels.com
www.scandichotels.fi

2

Hotel Scandic Simonkenttä

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Tel: +358 9 68 380 | Fax: +358 9 68 38 111
simonkentta@scandichotels.com
www.scandichotels.fi

3

Crowne Plaza Helsinki

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helsinki.cph@restel.fi
www.crowneplaza-helsinki.fi

4

Holiday Inn – Helsinki City Centre

Elielinaukio 5, FI-00100 Helsinki
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helsinki.hihcc@restel.fi
www.ihg.com/hotels/gb/en/reservation

5

Hotel Seurahuone

Kaivokatu 12, FI-00100 Helsinki
Tel: +358 9 69 141 | Fax: +358 9 691 4010
helsinki.seurahuone@restel.fi
www.hotelliseurahuone.fi

6

Radisson Blu Plaza Hotel

Mikonkatu 23, FI-00100 Helsinki
Tel: +358 20 1234 700 | Fax: +358 20 1234 740
reservations.finland@radissonblu.com
www.radissonblu.com

7

Radisson Blu Royal Hotel

Runeberginkatu 2, FI-00100 Helsinki
Tel: +358 20 1234 700 | Fax: +358 20 1234 740
reservations.finland@radissonblu.com
www.radissonblu.com

8

Radisson Blu Seaside Hotel

Ruoholahdenranta 3, FI-00180 Helsinki
Tel: +358 20 1234 700 | Fax: +358 20 1234 740
reservations.finland@radissonblu.com
www.radissonblu.com

9

Original Sokos Hotel Helsinki

Kluuvikatu 8, FI-00100 Helsinki
Tel: +358 20 1234 600 | Fax: +358 20 1234 640
sokos.hotels@sok.fi
www.sokoshotels.fi

10

Original Sokos Hotel Vaakuna

Asema-aukio 2, FI-00100 Helsinki
Tel: +358 20 1234 600 | Fax: +358 20 1234 640
sokos.hotels@sok.fi
www.sokoshotels.fi

Visit us at our Bosch booth

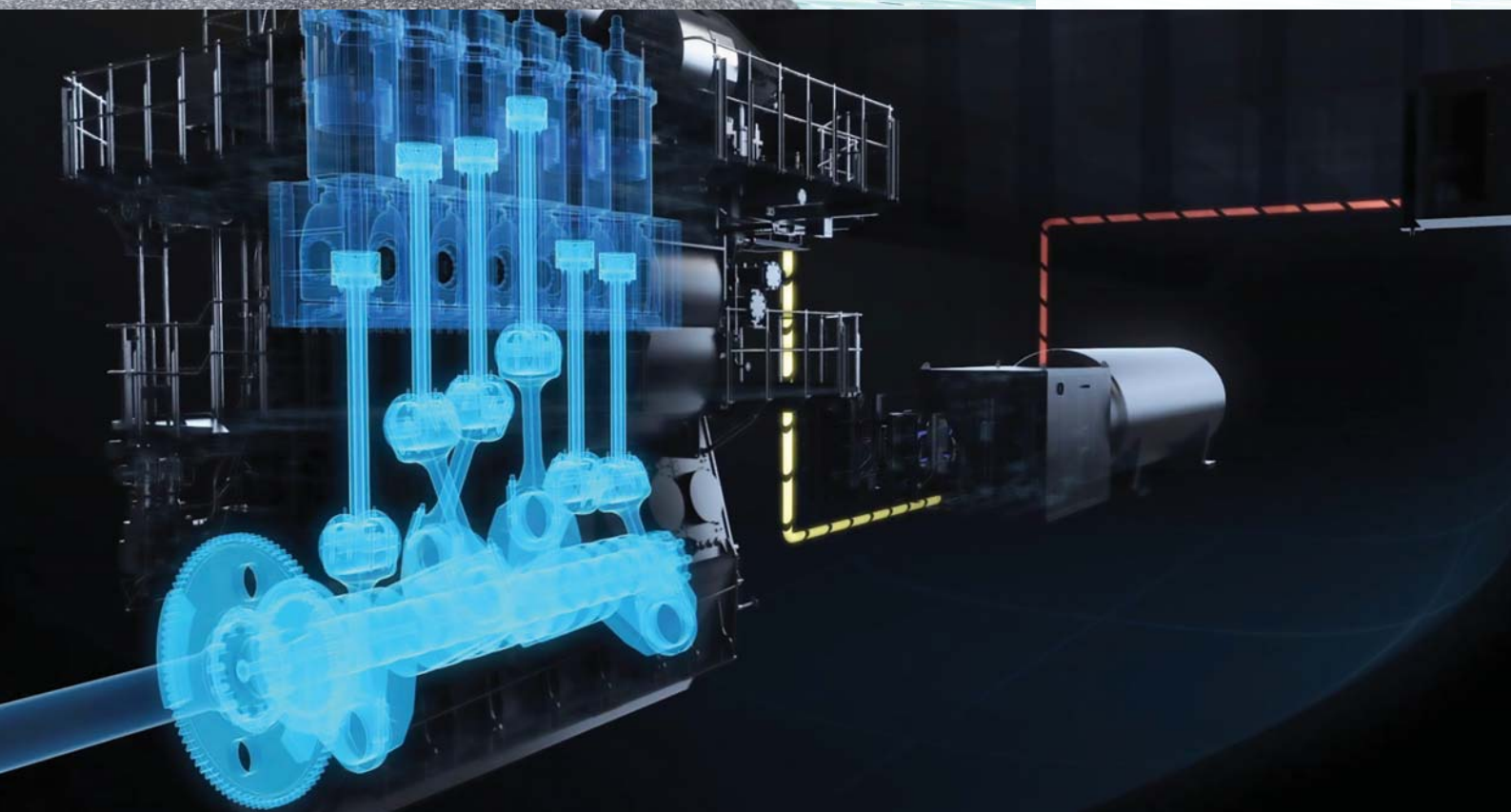
Large engines solutions from Bosch.

The Bosch portfolio comprises cutting-edge technology, from the smallest one-cylinder engine to the largest marine diesel engines – clean, economical, and powerful.

We look forward to presenting our solutions to you at CIMAC – for diesel, heavy fuel oil, and natural gas/dual fuel applications, for electronic engine management systems, and for exhaust-gas treatment, as well as our global service. www.bosch.com



BOSCH
Invented for life



X-DF powering the future

Winterthur Gas & Diesel (WinGD), a Joint Venture company between China State Shipbuilding Corporation (CSSC) and Wärtsilä, is a leading developer of 2-stroke low-speed Gas and Diesel engines.

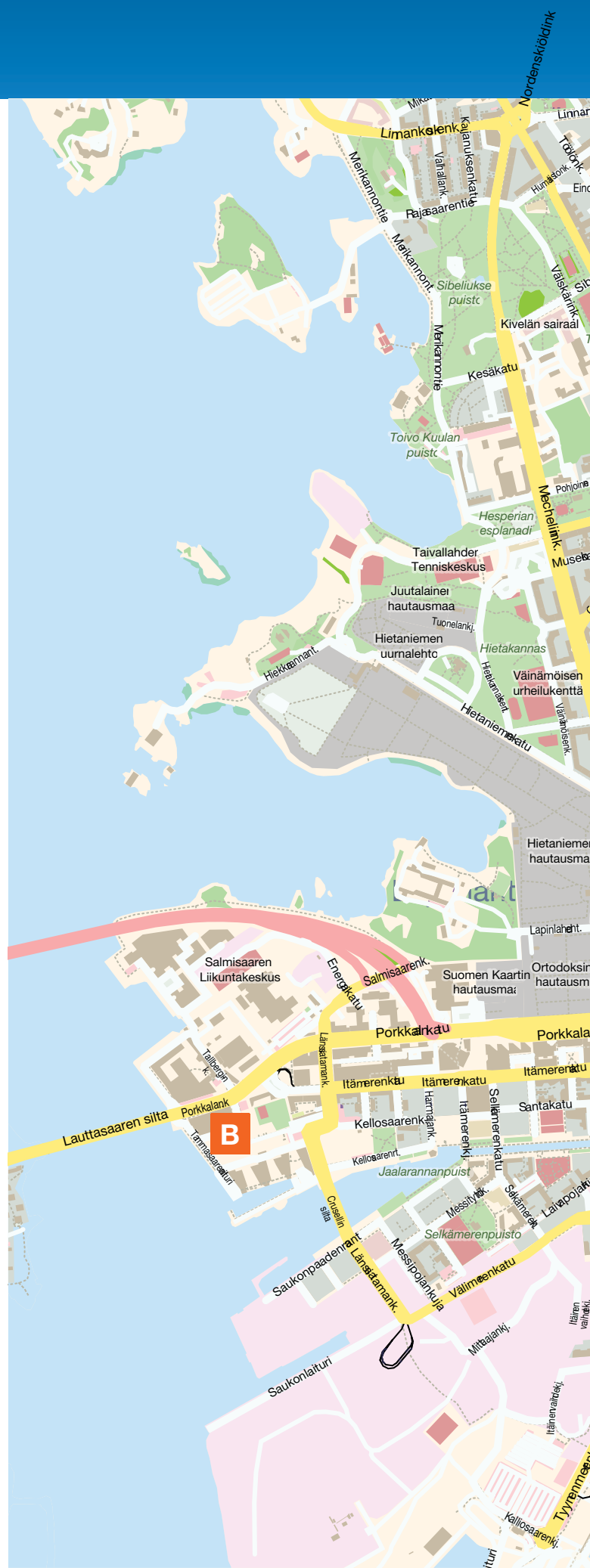
www.wingd.com

WIN GD
Winterthur Gas & Diesel

MAP OF HELSINKI

- 1** **Hotel Scandic Park**
Mannerheimintie 46, FI-00260 Helsinki
- 2** **Hotel Scandic Simonkenttä**
Simonkatu 9, FI-00100 Helsinki
- 3** **Crowne Plaza Helsinki**
Mannerheimintie 50, FI-00260 Helsinki
- 4** **Holiday Inn – Helsinki City Centre**
Elielinaukio 5, FI-00100 Helsinki
- 5** **Hotel Seurahuone**
Kaivokatu 12, FI-00100 Helsinki
- 6** **Radisson Blu Plaza Hotel**
Mikonkatu 23, FI-00100 Helsinki
- 7** **Radisson Blu Royal Hotel**
Runeberginkatu 2, FI-00100 Helsinki
- 8** **Radisson Blu Seaside Hotel**
Ruoholahdenranta 3, FI-00180 Helsinki
- 9** **Original Sokos Hotel Helsinki**
Kluuvikatu 8, FI-00100 Helsinki
- 10** **Original Sokos Hotel Vaakuna**
Asema-aukio 2, FI-00100 Helsinki

- A** Finlandia Hall
- B** Cable Factory
- C** Helsinki City Hall
- D** Halkolaituri
- E** Kiasma





Helsinki

REGISTRATION

You can register for the 28th CIMAC World Congress via the online booking form or by using the registration booking form on CIMAC Congress website www.cimaccongress.com. After online registration participants will receive a booking confirmation via email. Pre-registration will be open from the end of November until [May 27, 2016](#). After pre-registration closes, you can still register at the CIMAC Registration and Information Desk on site.

Opening Hours for Registration and Information

Sunday	June 5	14:00 – 18:00
Monday	June 6	08:00 – 18:00
Tuesday	June 7	08:00 – 18:00
Wednesday	June 8	08:30 – 18:00
Thursday	June 9	08:00 – 18:00

Pre-registration

Registration Fees

CIMAC Members	€ 1,695*
Non-members	€ 1,995*
Speakers	€ 1,295*
Students	on invitation only
Accompanying persons	€ 295*

One-Day Ticket	€ 495*
Exhibition Ticket per day	€ 50*
Gala Dinner only	€ 195*

* Prices excluding VAT

[Registration fees can be paid in EURO](#) via bank transfer or credit card in advance or by cash or credit card on site.

[The Congress fee for CIMAC members, non-members and speakers includes:](#) participation in the scientific programme, the Opening Ceremony, the Welcome Reception, ABB Evening and the Gala Dinner. Additional Congress components, such as the accompanying programme (optional tours, technical tours) must be booked and paid for separately. The Congress documents (programme,

Congress bag, abstract book, participant badge) as well as catering during breaks are included in the Congress fee.

[Students](#) have the above-mentioned services included – except participation in the Gala Dinner.

[The participation fee for accompanying persons includes:](#) admission to the exhibition, coffee breaks and lunch, Opening Ceremony, Welcome Reception, ABB Evening and Gala Dinner.

TIME SCHEDULE

Day	Time	Activities
Sunday June 5, 2016	14:00 – 18:00	Pre-registration Attention!
	14:00 – 18:00	Speakers' Preparation
Monday June 6, 2016	08:00 – 18:00	Registration and Congress Information Desk
	10:00 – 18:00	Speakers' Preparation
	10:00 – 17:00	Exhibition
	10:00 – 11:30	Opening Ceremony Welcome!
	12:00 – 13:00	CIMAC Press Conference Aurora Hall
	13:30 – 17:00	Technical Sessions
	18:30 – 20:30	Welcome Reception Keep in mind!
Tuesday June 7, 2016	08:00 – 18:00	Registration and Congress Information Desk
	08:00 – 18:00	Speakers' Preparation
	08:30 – 17:00	Exhibition
	08:30 – 17:00	Poster Sessions
	08:30 – 17:00	Technical Sessions
	18:00	ABB Evening Be there!
Wednesday June 8, 2016 <div>Users Day</div>	08:30 – 18:00	Registration and Congress Information Desk
	08:00 – 18:00	Speakers' Preparation
	09:00 – 17:00	Exhibition
	09:00 – 17:00	Poster Sessions
	09:00 – 17:00	Technical Sessions
	11:00 – 12:00	Keynote Speech by Harry Robertsson Technical Director, Stena Rederi AB Highlight!
	15:30 – 18:00	Users' Reception
Thursday June 9, 2016	08:00 – 18:00	Registration and Congress Information Desk
	08:00 – 15:00	Speakers' Preparation
	08:30 – 17:00	Exhibition
	08:30 – 17:00	Poster Sessions
	08:30 – 14:30	Technical Sessions
	15:00 – 16:30	Final Panel Discussion
Friday June 10, 2016	19:00	Gala Dinner Don't miss the Gala Dinner!
	09:00 – 16:00	Technical Tours (Arctic Tour, Fuel Tour, Research & Competence Tour)
	08:30 – 17:00	Technical Tours (The Roots of Industry in Finland)

SOCIAL EVENTS

DATE: JUNE 6, 2016

Welcome Reception

We are very pleased to welcome all participants in an extraordinary environment. The City Hall is one of the most splendid amongst the monumental buildings in Helsinki. Enjoy a pleasant and cheerful cocktail party evening at the City Hall of Helsinki.

Time: 18:30 – 20:30 h
Venue: City Hall of Helsinki
Pohjoisesplanadi 11 – 13 / 00099 Helsinki
Transfer: Shuttle busses from hotels



DATE: JUNE 7, 2016

ABB Evening

A highlight of every CIMAC Congress is the traditional ABB Evening, where ABB Turbocharging invites all Congress participants to an unforgettable event, with a program that is a surprise until the night itself. The only way to get to the event will be the shuttle buses provided by ABB.

Transfer: Shuttle busses from hotels
Departure time: 18:00 h



DATE: JUNE 9, 2016

Gala Dinner

Join the CIMAC community for a fantastic evening at the Cable Factory in Helsinki! Enjoy a spectacular venue, the entertainment programme with music and dance and an evening among friends. The Cable Factory is the largest cultural centre in Finland. It houses 3 museums, 12 galleries, dance theatres, art schools and a host of artists, bands and companies. Additionally various events, concerts, exhibits are taking place there.

We are looking forward to welcoming you!

Time: 19:00 h
Venue: Cable Factory
Tallberginkatu 1 / 00180 Helsinki
www.kaapelitehdas.fi/en/kaapelitehdas
Transfer: Shuttle busses from hotels





CIMAC

INTERNATIONAL COUNCIL
ON COMBUSTION ENGINES

2019
VANCOUVER

29th CIMAC WORLD CONGRESS

On behalf of CIMAC, the United States National Member Association, and Canadian members, we are happy to announce Vancouver as the host city for the 2019 Congress. Consistently voted 'Best City in the Americas' by Condé Nast Traveller magazine, Vancouver is a vibrant, cosmopolitan city nestled between majestic mountains and the glittering

Pacific Ocean. A modern city on the edge of a spectacular natural playground, Vancouver has built a reputation worldwide as a premier destination for meetings and conventions.

Vancouver looks forward to welcoming CIMAC delegates in 2019!



QUICK FACTS

Accommodation

For information about selected hotels in Helsinki please see page 48 and 50 – 51.

Cancellation of Congress Participation

Cancellations are only possible up to **30 April 2016** at the latest. On cancellation of participation, the participation fee will be refunded minus the administrative charge amounting to € 180. Cancellations or refunds at a later date are not possible. There shall be no refunds of participation fees for non-attendance without a cancellation within the stipulated period.

CIMAC

CIMAC is the non-commercial sponsor of the 28th CIMAC World Congress in Helsinki. Further information about CIMAC can be found on the website <http://www.cimac.com/>

CIMAC Membership

If you are uncertain about your membership status or want to apply for membership, please contact the CIMAC Central Secretariat: info@cimac.com

Congress Catering

Catering stations will be integrated in the exhibition area. During the coffee break and lunch break participants will be provided with food and drinks. Enjoy local and international cuisine!

Congress Documents

Reserved and paid Congress tickets will be provided at the registration desk on site. Please collect your Congress badge and bag at the registration desk. Your personal badge is your entrance ticket to all sessions, the exhibition and the social events. Please remember to wear your badge at the Congress and the social events at all times.

Contact for Questions

For questions regarding the technical programme, please contact CIMAC Central Secretariat. For questions regarding the Congress, sponsoring and exhibition, please contact the main and the co-organiser of the Congress. For contact details see page 48.

Cloakroom

Participants may leave their belongings in the designated area.

Language

The official language of the Congress is English. No translation will be provided.

Newsletter

To subscribe to the CIMAC Newsletter please complete the form on the CIMAC website: <http://www.cimac.com/publication-press/newsletter-subscription/index.html>

Mobile App

A mobile app will be available for downloading in [Google Play](#) and [Apple App Store](#) for all Congress participants in May. The app contains the technical programme, general information, floor plans and additional information.

Optional Tours

For participating in the optional tours, separate registration will be necessary! Please see pages 26 – 30 for further information.

Payment

Fees are charged on behalf of and for the account of the Congress organiser and include the statutory value-added tax. All fees are due immediately after receipt of the invoice. Payments are only accepted in EUR.

Social Media

Fans and followers will find the CIMAC Congress on [LinkedIn](#) and [Twitter](#).

Speakers' Preparation Room

All presentations can be reviewed and delivered at the speakers' preparation room at least 2 hours prior to the speaker's session. Presentations being held during a morning session should be reviewed at the end of the day before. Speakers are kindly requested to follow the instructions of the chair and strictly keep to the time of their presentation.

Technical Programme

Admission to all sessions of the technical programme is only possible with a valid Congress ticket. The Congress ticket for **CIMAC Members, Non-members, Speakers and Students** includes: Congress badge, Congress bag, admission to all sessions and the exhibition, coffee breaks and lunch, Opening Ceremony, Welcome Reception, ABB Evening, Gala Dinner (except students). The registration for **accompanying persons** includes: admission to the exhibition, coffee breaks and lunch, Opening Ceremony, Welcome Reception, ABB Evening, Gala Dinner.

Technical Tours

Separate registration is required for participation in the technical tours. Please see pages 24 – 25 for further information. Bus transport to the airport can be arranged at the end of the tours in case of late afternoon departures.

WIFI

Free WIFI is available in the Finlandia Hall. The login and password will be announced on site.

ORGANISERS



Main Organiser Congress

Gesellschaft zur Förderung des Maschinenbaues mbH (GzF)

Lyoner Strasse 18, 60528 Frankfurt am Main, Germany

Contact: Bettina Fritsch

Phone: +49 69 6603-1887

Fax: +49 69 6603-2887

Email: congress@cimac.com

Web: www.cimaccongress.com

www.gzf-expo.de



Co-Organiser Congress

CIMAC National Member Association The Federation of Finnish Technology Industries (FFTI)

Branch Group Combustion Engines and Turbotechnic

Eteläranta 10, 00131 Helsinki 13, Finland

Contact: Merja Salmi-Lindgren

Phone: +358 9 192 3385

Fax: +358 9 624 462

Email: cimac2016@techind.fi

Web: www.techind.fi



Co-Organiser Exhibition

Hamburg Messe und Congress International GmbH

Messeplatz 1, 20357 Hamburg, Germany

Contact: Sybille Lang

Phone: +49 40 3569-2293

Fax: +49 40 3569-692293

Email: cimac@hamburg-messe.de

Web: www.hamburg-messe.de/en/visitors/trade-fairs-abroad



Non-Commercial Sponsor

CIMAC

Lyoner Strasse 18, 60528 Frankfurt am Main, Germany

Contact: Dorothee Günther

Phone: +49 69 6603-1355

Fax: +49 69 6603-2355

Email: info@cimac.com

Web: www.cimac.com

ABOUT CIMAC

CIMAC: the Global Forum for Large Engines and their Applications

Originally founded in Paris in 1951, CIMAC has become **the leading global association of the internal combustion machinery industry**. It is a non-profit association bringing together and representing the large engine industry to regulators and standardising bodies. In addition to promoting the work of National Member Associations, it supports information exchange and understanding across the large combustion engine industry including:

- Builders of large diesel, gas and dual-fuel engines
- Users of large engines such as owners and operators of ships, power plants, locomotives etc.
- Systems and component suppliers
- Fuel and lubricant suppliers, including oil companies
- Classification societies and other regulatory bodies
- Academic institutions, consultant engineers, scientists
- Other service providers

CIMAC's Mission is to:

- ▶ promote exchange of scientific and technical information via its Congresses, CIMAC Circles and CIMAC CASCADES events
- ▶ improve understanding between engine manufacturers and engine users
- ▶ improve understanding between engine manufacturers and their suppliers
- ▶ focus upon and promote the work and activities of National Member Associations
- ▶ promote exchange on technological developments in a pre-competition state, e.g. in its Working Group meetings
- ▶ contribute to internationally applied technological standards and publications
- ▶ collaborate with other international associations

CIMAC Membership

CIMAC members currently come from **25 countries** across North and South America, Asia and Europe. Membership can take three forms:

- Membership of the official CIMAC National Member Association in your country
- Membership of National Member Groups
- Corporate Membership for individual companies

Please see pages 56 and 58 for CIMAC contact details.

CIMAC Working Groups: the Consensus Seekers

CIMAC Working Groups are the heart of CIMAC. Led by **international specialists** from CIMAC member organisations, they seek solutions to industry-wide technical issues.

They interface with legislators, standards organisations, and regulators such as the classification societies to develop a united CIMAC recommendation or a position paper, representing the industry as a whole, on a pre-competitive, pre-legislative basis. They have a distinguished record of issuing guidance and published media articles on a wide range of crucial subjects relating to the operation of large diesel, gas and dual-fuel engines.

Consequently, CIMAC Working Group activities encompass the environmental compatibility, efficiency and safety of large engines and their applications.

CIMAC Working Groups currently cover these vital areas of engine technology and operation:

- | | |
|----------------------------------|---------------------------|
| ■ Classification | ■ Gas Engines |
| ■ Crankshaft Rules | ■ Inland Waterway Vessels |
| ■ Electronics & Software Systems | ■ Marine Lubricants |
| ■ Exhaust Emissions Control | ■ System Integration |
| ■ Fuels | ■ Users |

CIMAC Events

The CIMAC Congress represents the culmination of all CIMAC activities, being held every three years, each time in a different member country. Spanning the globe as well as all technology aspects, the Congress is **a unique gathering of key industry decision makers**, including engine owners and operators, researchers and developers, and representatives from the engine, component and consumables industries.

The Congress programme centres on the **presentation of technical papers** on engine research, development, application engineering on the original equipment side, and engine operation and maintenance on the end-user side. This is complemented by a social programme which promotes friendship and networking among engine builders and engine users.

CIMAC Circles are panel discussions involving CIMAC members debating topical issues. They are hosted at key industry events around the world at least once a year.

CIMAC CASCADES promote the advancement of young engineers and their careers. The events enable them to meet with leading industry experts to exchange information, network and present their projects.

REVIEWERS TECHNICAL PROGRAMME

Person	Company	Place
Aabo, Kjeld	MAN Diesel & Turbo	Copenhagen, Denmark
Aufischer, Rainer Dr.	Miba	Laakirchen, Austria
Beran, Robert Dr.	AVL List	Graz, Austria
Boletis, Elias	Wärtsilä Corporation	Drunen, Netherlands
Boom, Rick	Woodward	Hoofddorp, Netherlands
Brewster, Simon	Ricardo	Shoreham by Sea, West Sussex, United Kingdom
Callahan, Timothy J.	Southwest Research Institute	San Antonio, TX, United States
Delneri, Diego	Wärtsilä Corporation	Trieste, Italy
Dijks, Albertus	N.V. Nederlandse Gasunie	Groningen, Netherlands
Flynn, Paul Dr.	GE Transportation	Erie, PA, United States
Frigge, Patrick	GE Jenbacher	Jenbach, Austria
Goto, Satoru	Niigata Power Systems	Tokyo, Japan
Götze, Hans-Joachim Dr.	DNV GL	Hamburg, Germany
Gust, Edgar Dipl.-Ing.	ZOLLERN BHW Gleitlager	Braunschweig, Germany
Haueisen, Volkmar Dr.	ABB Turbo Systems	Baden, Switzerland
Heim, Klaus M.	OMT	Cascine Vica - Rivoli (Torino), Italy
Hellén, Göran	Wärtsilä Corporation	Vaasa, Finland
Heuser, Peter Dr.	FEV	Aachen, Germany
Hiltner, Joel David Dr.	Hiltner Combustion Systems	Ferndale, WA, United States
Hostrup Poulsen, Hanne Dr.	MAN Diesel & Turbo	Copenhagen, Denmark
Hupperich, Patrick Dr.-Ing.	FEV	Auburn Hills, MI, United States
Itoh, Yasuhiro	Niigata Power Systems	Tokyo, Japan
Kahle, Jørn	A.P. Møller - Mærsk	Copenhagen, Denmark
Kjemtrup, Niels	MAN Diesel & Turbo	Copenhagen, Denmark
Koch, Franz Dr.	hofer at GmbH	Lenting, Germany
Ludu, Andrei Dipl.-Ing.	AVL List	Graz, Austria
Marquard, Ralf Dr.	FEV	Aachen, Germany
Mohr, Hinrich Dr.	AVL List	Beckdorf-Nindorf, Germany
Nerheim, Lars Magne Prof.	Bergen University College	Bergen, Norway
Nordrik, Rune Dr.-Ing.	Rolls-Royce Marine	Godvik, Norway
Ohtsu, Masaki	MES	Okayama, Japan
Okabe, Masahiko	Mitsubishi Heavy Industries	Tokyo, Japan
Pedersen, Michael Finch	Maersk	Copenhagen, Denmark
Pischinger, Stefan Prof. Dr.-Ing.	FEV	Aachen, Germany
Rippl, Alexander Dr.-Ing.	MAN Diesel & Turbo	Augsburg, Germany
Ritscher, Bert	Caterpillar Motoren	Kiel, Germany
Roduner, Christian Hans Dr.	ABB Turbo Systems	Baden, Switzerland
Rojgaard, Charlotte	BV Inspectorate	Copenhagen, Denmark
Schmuttermair, Herbert Dr.	MAN Diesel & Turbo	Augsburg, Germany
Stiesch, Gunnar Prof. Dr.-Ing.	MAN Diesel & Turbo	Augsburg, Germany
Sugiura, Kimihiko	MAN Diesel & Turbo	Kobe, Japan
Takasaki, Koji Prof. Dr.	Kyushu University	Fukuoka, Japan
Teetz, Christoph	MTU Friedrichshafen	Friedrichshafen, Germany
Tonon, Paolo	Maersk Maritime Technology	Copenhagen, Denmark
Vlaskos, Ioannis Dr.-Ing.	Ricardo Deutschland	Schwäbisch Gmünd, Germany
Wang, Allan-QingZhou	ABB Jingjin Turbo Systems	Shanghai, China
Weisser, German Dr.	ABB Turbo Systems	Baden, Switzerland
Wik, Christer	Wärtsilä Corporation	Vaasa, Finland
Wimmer, Andreas Ao. Univ.-Prof. Dr.	LEC	Graz, Austria
Wojik, Karl Dipl.-Ing.	AVL List	Graz, Austria
Östman, Fredrik Dr.	Wärtsilä Corporation	Vaasa, Finland



SkafurTour

Active holidays in Finland



Photo: Valentino Valkaj

Get most out of your Congress Tour

Experience Helsinki.

Take a culinary or music walk, a bike, design or Suomenlinna tour. Lunch tours are offered from Tuesday to Thursday during the congress week.

Wednesday night dinner tours take you to the unique nature of Finland. Choose between sea and forest, a cruise by a sailing ship or a hike and sauna in Nuuksio National Park.

Book together with your registration. By booking in advance you ensure the availability of the tour. Remaining seats are sold until the event date at the venue.

Relax in nature after the congress.

Lapland Midnight Sun

1-day 11.–12.6. 297€ and 2-day 10.–12.6. 617€
<http://skafur-tour.fi/cimac-midnight-sun/>
<http://skafur-tour.fi/cimac-midnight-sun-long/>

Bus tour to the Archipelago

2-day 10–12.6. 457€
<http://skafur-tour.fi/cimac-archipelago/>

Book by 13th May directly from Skafur-Tour.

Read more: <http://skafur-tour.fi>

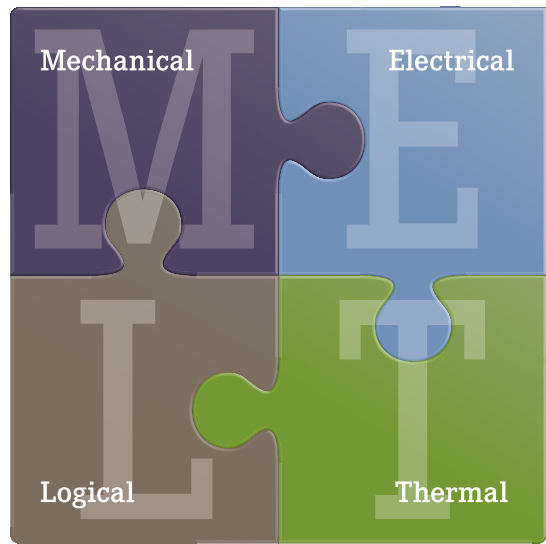
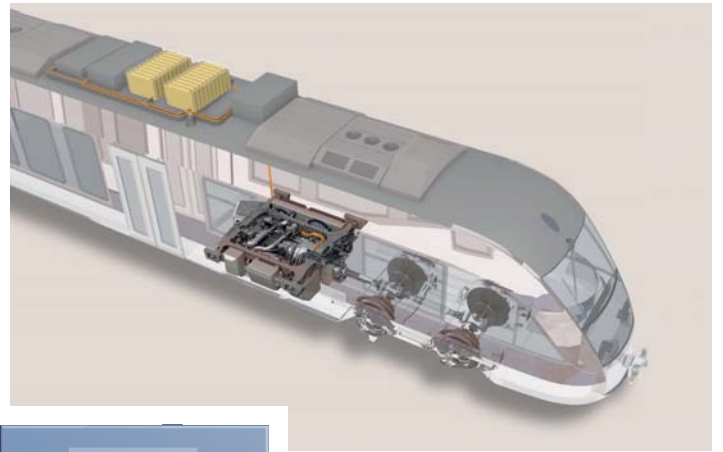
Contact: riitta@skafur-tour.fi
or +358 45 1738979

**Come and meet us at
the Finlandia Hall!**



CO-CHAIRS TECHNICAL PROGRAMME

Person	Company	Place
Aakko-Saksa, Päivi	VTT Technical Research Centre of Finland	Espoo, Finland
Kim Backman	Mapromec	Mustasaari, Finland
Delneri, Diego	Wärtsilä	Vaasa, Finland
Huhtala, Kalevi	Tampere University of Technology	Tampere, Finland
Hyvönen, Jari	Wärtsilä	Vaasa, Finland
Juoperi, Kai	Wärtsilä	Vaasa, Finland
Kaario, Ossi	Aalto University	Espoo, Finland
Kijärvi, Jukka	University of Vaasa	Vaasa, Finland
Kuosmanen, Petri	Aalto University	Espoo, Finland
Larmi, Martti	Aalto University	Espoo, Finland
Lehto, Kalle	Neste Corporation	Espoo, Finland
Lehtoranta, Kati	VTT Technical Research Centre of Finland	Espoo, Finland
Mäkelä, Tarmo	Parker Hannifin Corporation	Urdala, Finland
Niemi, Seppo	University of Vaasa	Vaasa, Finland
Pippuri, Jenni	VTT Technical Research Centre of Finland	Espoo, Finland
Pisilä, Sakari	Componenta Corporation Pistons	Pietarsaari, Finland
Rantanen, Olli	Parker Hannifin Corporation	Urdala, Finland
Rönnskog, Tommy	Componenta Corporation Pistons	Pietarsaari, Finland
Rösgren, Jonatan	Wärtsilä	Vaasa, Finland
Salo, Jouko	Auramarine	Turku, Finland
Sirviö, Katriina	University of Vaasa	Vaasa, Finland
Syrjänen, Teemu	ABB Oy Turbocharging	Helsinki, Finland
Tammi, Kari	Aalto University	Espoo, Finland
Tamminen, Jaana	Wärtsilä	Vaasa, Finland
Turunen-Saaresti, Teemu	Lappeenranta University of Technology	Lappeenranta, Finland
Vaarasto, Matti	Wärtsilä	Vaasa, Finland
Vuorinen, Ville	Aalto University	Espoo, Finland
Åkerman, Jonas	Wärtsilä	Vaasa, Finland



MTU Propulsion Systems.

We design and supply customer specific propulsion systems in a power range from 315 kW (422 bhp) up to 4300 kW (5766 bhp) for Commercial Marine, Yacht and Rail applications with diesel and gas engines. Additionally MTU MELT Engineering helps you and your customer to manage the complexity of E-Drive systems.

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CIMAC President

MTU Friedrichshafen
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United States



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Vervaeke, L.

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Ganem Flores, M.
Kremer, F. G.

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Quingwei, Yao

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Klima, J.

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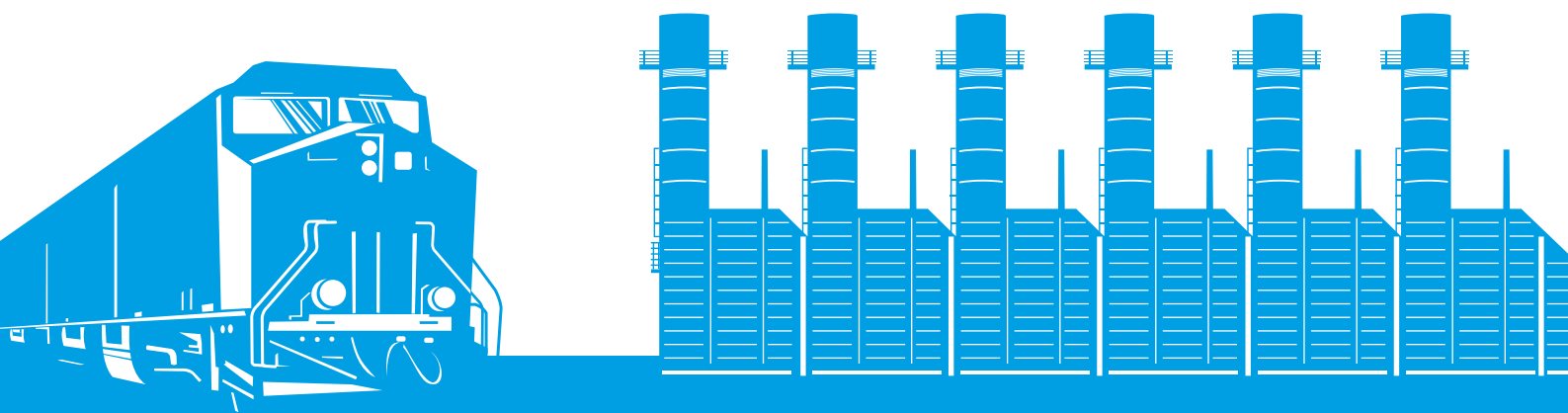
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