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DE L'AUTOMOBILE

29TH EDITION



PROCEEDINGS - ABSTRACTS BOOK 2017-01

International Conference and Exhibition

SIA POWERTRAIN // VERSAILLES 2017

The low CO₂ spark ignition engine of the future
and its hybridization

 VERSAILLES, FRANCE
7 & 8 June 2017



automotive
engineering



Innovation in Motion



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FEV

The automotive industry is entering one of the most exciting periods in its history: driving aids, high-tech embedded systems, connected cars, large-scale hybridization... in an ultra-competitive environment.

Automotive powertrains, especially gasoline, are first in line to benefit from these opportunities but also to meet future challenges: provide global solutions at reasonable costs and provide performance benefits with increasing respect for environmental issues. Implementing overall powertrain optimization strategies plus hybrid energy distribution will also confirm transmissions' key role.

In this context, the 2017 SIA Powertrain Congress in Versailles addresses "The low CO₂ gasoline engine of the future and its hybridization." The gasoline engine, hybrid or not, has a major role to play: it supports the international development of the automotive industry by meeting most global market needs, it now offers leading performance through downsizing, and its strong synergy with hybridization helps optimize benefits vs. costs.

We hope that you will enjoy the scientific programme and panel session talks, that you will be amazed by the exhibition and that you will benefit from the great networking. Thank you for making this 2017 edition - the 29th of SIA POWERTRAIN Conference - a great success! We look forward to discussing and debating with you during this 2-days event.

The Conference Chairmen
Philippe Bernet & Erwann Samson

SAVE THE DATE



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ROUEN 2018

International Conference and Exhibition

SIA POWERTRAIN // ROUEN 2018

30TH EDITION

The Clean Compression Ignition Engine
For Passenger Cars & Commercial Vehicles

16 & 17 MAY 2018

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DOWNLOADS

Technical papers

Speakers presentations

You will receive an e-mail after the conference with a link to download the PDF speakers' presentations.

Please note that some speakers can refuse to disseminate their presentations.

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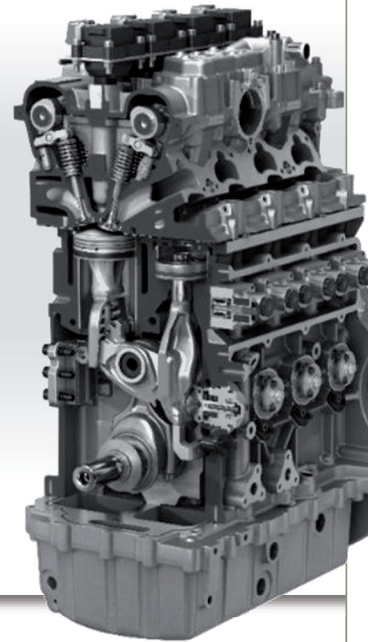
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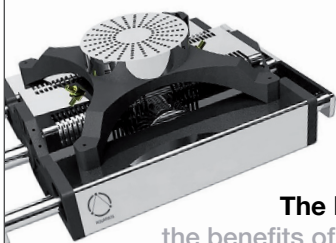
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- **Une première étape ...**



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The New Series Hybrid Powertrain the benefits of EV's without range limitations.

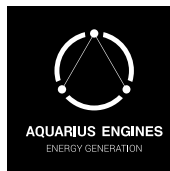
In a world in which the demand for energy resources is ever increasing while environmental restrictions and regulations become stricter, there is an increasing need for innovative solutions that reconcile these conflicting trends.

Following several years of research and experimentation, Aquarius Engines Ltd. has designed, developed and produced a breakthrough electricity power generator, designed around a free-piston linear ICE engine. This innovative power generator is aimed specifically at the car industry, as well as other markets who can benefit from highly efficient power generators.

This Aquarius Engines' generator, which is dramatically cheaper, cleaner and more efficient than existing engines, is about to revolutionize the market of electric cars as well as the power generators market in general.

This Aquarius Engines' generator has recently undergone reviews by leading engine design and engineering companies, with exceptionally promising results. The company is currently engaged with several of the world's leading car manufacturers, as well as multi-billion companies in the generators industry.

Aquarius Engines was founded several years ago by highly experienced and skilled professionals, who have a proven track record in design, development and improvement of innovative engines. The company is backed by top tier committed investors and has already registered two patents in the US, with over a dozen of additional national and PCT patents applications, filed by Finnegan, a leading intellectual property (IP) law firm.



The Power Generators by Aquarius.

Aquarius Power Generator

The Aquarius Power Generator is a stand-alone, off-grid generator for residential and commercial use. The Aquarius unit is cheaper and more compact than other units and has a higher power-to-weight ratio. In 2014 the market for power generators was estimated at \$16.6 billion, and it is expected to grow to \$25 billion by 2024.

The Series Hybrid Powertrain by Aquarius.

Integrated Power Drive (IPD)

The Aquarius power unit meets the challenges of the electric cars of the future, which require an on-board lightweight, high efficiency and low emission power source. It will allow the electric cars to reach a much broader scope of users.

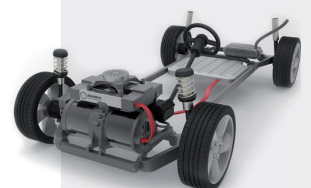
Aquarius, together with four of its partners, has developed and built a fully integrated IPD (Integrated Power Drive) solution, designed for integration of the Aquarius Engines' generator unit into any HEV or EV vehicle.

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32 kW
Engine only 15Kg **80 kg.**
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1.600 Km



A concept car with the new Aquarius IPD integrated solution is scheduled for testing during 2017.

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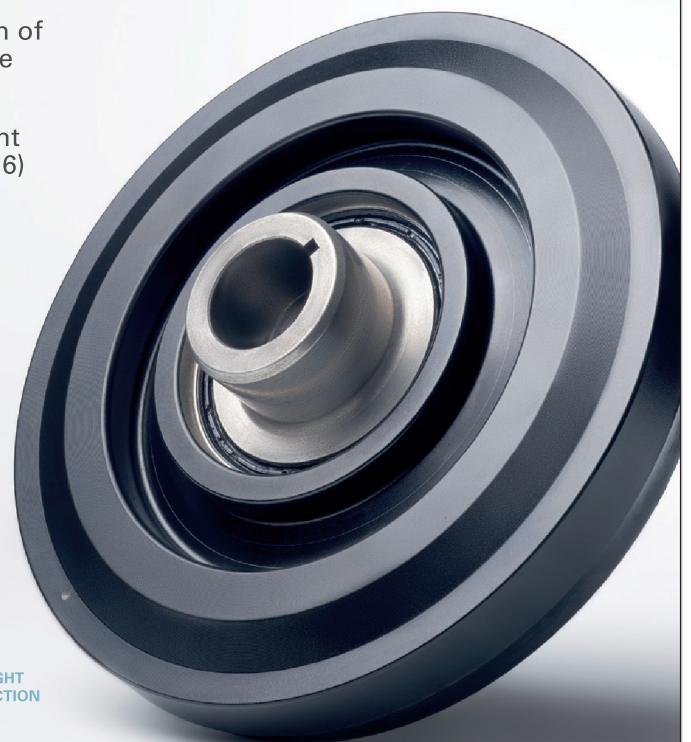
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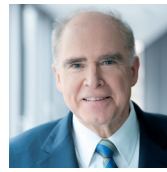
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inspiring mobility

PANEL SESSION



Christian CHAPPELLE

Head of Powertrains and Chassis
Groupe PSA



Helmut LIST

President
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Bruno COVIN

Vice president, Alliance Powertrain
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PROGRAMME // 7 JUNE 2017

RICHELIEU ROOM (FLOOR 0)	CONDÉ ROOM (FLOOR +1)
LULLI ROOM (FLOOR -1)	COLBERT ROOM (FLOOR +2)

07:30 > ATTENDEES REGISTRATION - BREAKFAST IN THE EXHIBITION

OPENING PLENARY SESSION & KEYNOTE SPEECHES

08:30 > Opening address by the Conference Chairmen

Philippe BERNET | Renault & Erwann SAMSON | Groupe PSA

08:45 > Global Energy Demand from Road Transportation Vehicles - A View by 2030 by the PFA & BIPE

Catherine GIRARD - Expert Leader, Strategy on Energy and Raw Materials | Renault

09:00 > Renewable fuels: a natural way for green ICE enabling a circular economy

Dario SACCO, Head of Powertrain Research and Technology | Centro Ricerche FIAT

09:15 > The SI Engine: at the end of its development?

Frank ALTENSCHMIDT - Development Engineer | Daimler

09:30 > Consideration of Powertrain Rational Evolution through Electrification

Masaaki KUBO - Powertrain advanced engineering Alliance General Manager | Alliance Renault Nissan

09:45 > Technology Trends For Gasoline Injection Systems

Philippe BERCHER - Deputy Engineering Director FIE, Powertrain Systems | Delphi

10:00 > The transformation of powertrain with electrification

Michel FORISSIER - Product Marketing, Research and Development Director | Valeo

10:15 > Panel Discussion with the Keynote Speakers

10:30 > COFFEE BREAK

	VARIABLE COMPRESSION RATIO Philippe BERNET Renault & Erwann SAMSON Groupe PSA	CYLINDER DEACTIVATION & CAM PHASING Geoffroy MARTIN MOVEO & Ricardo NOVELLA CMT	EGR MANAGEMENT Emmanuel JEAN Faurecia & Daniel ROETTGER Ford	ENERGY MANAGEMENT & CONTROL Franck ALTENSCHMIDT Daimler & Yasuo MORIYO-SHI Chiba University
11:00 >	Combination of Variable Compression Ratio and Early Intake Valve Closing as a Basis for Future Highly Efficient Gasoline Engines U. Walther, M. Günther, M. Hunger, J. Mueller, S. Nicklitzsch, M. Sens IAV S. Zwahr West Saxon University of Applied Sciences of Zwickau	Potentials of Modern Camshaft Phasing Systems P. Solfrank, J. Dietz Schaeffler	Optimisation of Low Pressure EGR to Reduce BSFC on a 3-Cylinder Gasoline Turbocharged Direct Injection Engine S. Petrovic, A. Kuske, C. Vigild, K. Grieser, J. Groeger, C. Weber Ford	Predictive and Optimal Control for Connected Hybrid Vehicle M. Sans Continental Automotive
11:30 >	AVL Dual Mode VCS™ - The Modular and Cost Efficient CO ₂ Reduction H. Sorger, W. Schöffmann, S. Lösch, A. Krobath, A. Fürhapter, W. Unzeitig, G. Fraidl AVL K. Arens, Th. Weiß, M. Heller iwis motorsysteme	Dynamic Skip Fire: The Ultimate Cylinder Deactivation Strategy M. Younkins, J. Fuerst, S. Carlson Tula Technology J. Kirwan, E. Jacque, S. Mafrica Delphi Automotive	LP EGR mixing under RDE extended conditions: analysis of key parameters influencing condensation I. Vidal García, I. González Tabarés, A. Sotelo Álvarez, X. Pérez Mauricio BorgWarner	Online Optimal Control of a Plug-in Hybrid Electric Vehicle with Adaptive Battery Discharge Management T. Miro Padovani, A. Ketfi-Cherif Renault
12:00 >	VCR-VVA-High Expansion Ratio: A Very Effective Way to Miller-Atkinson Cycle C. Constensou, V. Collee MCE-5 Development	Innovative Active Torsional Vibrational Damping System for Engine Cylinder Deactivation, Down Speeding & Best Comfort F. Schneider, V. Saxena, A. Moser BorgWarner	Simultaneous Achievement of Low Emissions and High Efficiency through Dedicated Exhaust Recirculation T. Alger, T. Briggs, C. Chadwell, B. Denton, D. Robertson, C. Henry, G. Bartley Southwest Research Institute	Fuel Economy Benefits of Electrified Powertrains with Advanced Combustion Engines: Mild to Strong HEV Applications M. Shahbakhti Michigan Technological University A. Solouk Ford

12:30 > LUNCH BREAK

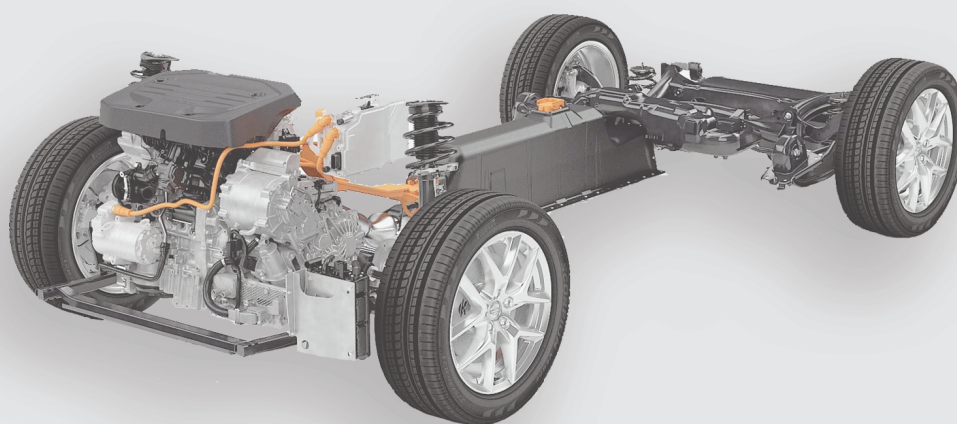
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APPLICATIONS //

- ENERGY PERFORMANCE ANALYSIS
- BENCHMARKING
- MODEL CALIBRATION
- SYSTEM VALIDATION

- PROTOTYPING & TESTING
- DEVELOPMENT OF PROOF OF CONCEPT
- PRODUCTION OF SPECIFIC TEST BENCHES

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PROGRAMME // 7 JUNE 2017

RICHELIEU ROOM (FLOOR 0)

CONDÉ ROOM (FLOOR +1)

LULLI ROOM (FLOOR -1)

COLBERT ROOM (FLOOR +2)

	ADVANCED ENGINE CONCEPTS Ali MOHAMMADI Toyota Europe & Andy WARD Ricardo	PARTICULATE EMISSIONS MITIGATION Nadim ANDRAOS FEV & Jean Marc BOULARD IAV	EFFICIENT ENGINE & IGNITION Hans NUGLISCH Continental & Marc SENS IAV	HYBRID TRANSMISSIONS Jérôme MORTAL Jaguar Land Rover & Alex TYLEE DSD
14:00	> Investigation of Combustion Engine Concepts for the use in an Electrified Powertrain V. Bevilacqua, G. Corvaglia, M. Böger, M. Penzel, K. Fuoss, G. Grauli Porsche	Emissions from Vehicle Exhaust of Gaseous Precursors of Atmospheric Particles K. Sartelet, Y. Kim, C. Seigneur CERE	Increasing Modern Spark Ignition Engine Efficiency: Optimization of intake ports dedicated to Miller cycle, high dilution and increased compression ratio J. Trost, O. Laget, M. Cordier, F. Duffour, X. Gautrot IFPEN	Electric Drive Units for Hybrid/Electric Vehicles F. Garbo, A. Michaelides, J. Mortal Jaguar Land Rover
14:30	> A Modular Base Engine Architecture for 48V Mild Hybrid Applications P. Grzeschik, J. Scharf, T. Uhlmann, M. Souren, A. Balazs, S. Sonnen, A. Koch, B. Stapf, C. Nebbia FEV	Gasoline Particulate Filters - Market and Technology Trends and their Impact on Calibration M. Görgen, S. Herrmann, M. Hendriks, M. Nijs, J. Scharf FEV S. Sterlepper Institute for Combustion Engines, RWTH Aachen University	Engine and Aftertreatment Strategies for Lean Gasoline Engines to Meet Real Driving Emissions Legislation E. Koehler, R. Osborne, M. Keenan, T. Downes Ricardo	2L/100km Eolab to global PHEV-HEV project solution N. Fremau, A. Ketfi, A. Vignon Renault
15:00	> 200kW/l: Modular Engine Family Stretch for Highest Commonality and Performance M. Neubauer, P. Kapus, D. Hilbert, W. Schöffmann, K. Prevedel, C. Wolf AVL	Performance of advanced Gasoline Particulate Filter Material for Real Driving Conditions D. Waters, D. Thier, Y. Ito, M. Yamashita, C. D. Vogt, K. Kato, T. Shimoda, T. Aoki, M. Makino NGK	Homogenous Lean Burn Combustion for Gasoline Engines: A Comparison between High Energy Spark Ignition and High Frequency Corona Ignition Systems A. Paa, G. Rottenkolber, M. Wörner, C. Spang, T. Friedrich University of Applied Sciences Esslingen	PREX 3: Next generation of DHT with full on demand Actuation P. Janssen, Y. Zhang FEV
15:30	> Extremely Downsized Gasoline Demonstrator Vehicle M. Bassett, J. Hall, T. Cains MAHLE Powertrain R. Wall Aeristech		A Novel Low-Temperature Plasma Ignition System Applied to a GHP Engine O. Matsumoto Sustainable Engine Research Center T. Kuboyama, Y. Moriyoshi Chiba University T. Nakamura, Y. Kinuzawa Toyota K. Tanoue Ohita University	The Future for the Connected Drivetrain Systems S. Shepherd Drive System Design
16:00	COFFEE BREAK			
	PANEL SESSION Moderator: Laurent Meillaud, Automotive Journalist			
16:30	> Christian CHAPPELLE - Head of Powertrains and Chassis Groupe PSA Bruno COVIN - Vice president, Alliance Powertrain Strategy Renault-Nissan Antony HARPER - Director of Engineering Research Jaguar Land Rover Helmut LIST - President AVL Robert MEYER - Vice President Corporate Strategy/Cooperations BMW Koichi NAKATA - Project General Manager, Advanced Engine Design & Engineering Div., Powertrain company Toyota			
	CLOSING ADDRESS			
18:30	> Jacques Graizon - SIA Chairman & Prof. Helmut LIST for the 10 years of AVL LMM in AVL Group			
18:45	COCKTAIL IN THE EXHIBITION			



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PROGRAMME // 8 JUNE 2017

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CONDÉ ROOM (FLOOR +1)

LULLI ROOM (FLOOR -1)

COLBERT ROOM (FLOOR +2)

08:00 > WELCOME COFFEE IN THE EXHIBITION

MICRO & MILD HYBRIDS

Pierre Yves GEELS | AVL
& Sébastien POTTEAU |
EMC-MTT

FUEL INJECTION

Rémy SCHMITT | BOSCH
& Philippe SOUHAITE |
Groupe PSABOOSTING
TECHNOLOGIESGunther FRAIDL | AVL &
Gaétan MONNIER | IFPENVIRTUAL ENGINE
DESIGNKyoungdoug MIN | Seoul
National University &
Jean Sébastien ROUX |
Honeywell08:30 > Next Gen 48 Volt Hybrids
by New Architectures and
Connectivity
F. Graf, S. Lauer | Continen-
tal AutomotivePort Fuel Injection:
Combustion Efficiency
Improvement & PN
Reduction
C. Genin | Continental
AutomotiveVNT™ Turbocharger for
Gasoline "Miller" Engines
N. Bontemps, J.-S. Roux, D.
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A. Schloßhauer | Institute
for Combustion Engines,
RWTH Aachen University
D. Lückmann, R. Aymanns
| FEVFully virtual Develop-
ment of a EU7 compliant
Gasoline Combustion
System, using an efficient
OD/1D/3D based Develop-
ment Approach
N. Genty, N. Iannucci,
A. Raulot, A. Tellier |
Groupe PSA
L. Boettcher, E. T. Faulseit,
C. Frottier, M. Riess,
M. Sens | IAV09:00 > 12+12V and 12+48V
Hybridization: A Modular
Approach and Transmis-
sion Impacts
O. Coppin | ValeoRealising Mixture Forma-
tion Benefits with a Dual
Port Fuel Injection (PFI)
System
A. Kevric, P. Richardson,
H. Kaneta, M. Iwamuro,
T. Mizobuchi, H. Shibata |
DENSOAC Cooler for Elec-
trical Supercharger
Compressed Air
E. Droulez | ValeoNumerical Study on the
Particle Number Emission
of Different Charge
Motion and Injection Stra-
tegies in a DI-SI Engine at
High Engine Load
D. Notheis, A. Velji, T. Koch,
M. Bertsch | KIT09:30 > The Hybridised Layshaft
Transmission
B. Chiswick, M. Lorenzo,
M. Hole | Drive System
DesignNear-Field Velocity Mea-
surement of a Multihole
GDI Injector
Y. Cao, J.-B. Blaisot, S. Ida-
hcen, C. Lacour | CORIAEnhanced Gasoline
Engine Performance with
Water Injection
J. Op de Beeck, L. Duez |
Plastic OmniumSimulation of Fast
Transients of GDI
Engines using Large-Eddy
Simulation
B. Roux, J. Bohbot, G. Pilla,
M. Cordier, A. Poubeau,
S. Jay | IFPEN

10:00 > COFFEE BREAK & STUDENTS POSTER SESSION !

REAL DRIVING
EMISSIONS
CHALLENGESJean Christophe LAMO-
DIÈRE | AVL & Philippe
BERCHER | Delphi

KNOCK MITIGATION

Alain FLOCH | Renault
& Jean-Jacques MILES
| DynergiaGASOLINE AUTO-
IGNITION CONCEPTSVirginie MOREL | ARAMCO
& Pierre DURET | IFP
SchoolADVANCED
TRANSMISSIONSOmar HADDED | DSD &
Pascal HERVET | Valeo11:00 > Increasing RDE Robust-
ness using Methods of
Statistical Learning
F. Springer, M. Hegmann,
M. Knaak, D. Reppel | IAVThe Effect of Thermal
Boundary Conditions on
Knock Characteristics in
a Single Cylinder Spark
Ignited Engine
S. Cho, C. Song, K. Min |
Seoul National University
M. Kim | Myeongji University
K.-P. Ha, B. Kim, I. Suh |
Hyundai Motor GroupTransition between SI and
CAI Operating Modes in
an Automotive, Low Cost,
Gasoline, 2-Stroke Engine
J. Benajes, J.J. Lopez, J.
Valero-Marco | CMT-Mo-
tores Térmicos
G. Coma, C. Libert | RenaultE-Clutch as an Enabler
for the Hybridisation of
Manual Transmissions
L. Muller, M. Kneißler,
T. Eckenfels | Schaeffler

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PROGRAMME // 8 JUNE 2017

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COLBERT ROOM (FLOOR +2)

11:30	> New modelling process to estimate real-world emissions P. Barker RICARDO	Knock Investigation through Optical Diagnostics in a Turbocharged GDI Engine using Fuels with Different Octane Number P. Sementa, F. Catapano, S. Di Iorio CNR ISTITUTO MOTORI	Injection Strategy for GCI Engine at Low Load P. M. Pinazzi, F. Foucher University of Orléans	Freewheeling Concept: Hybrid Benefits for Manual Transmission at Low Cost G. Bartley, S. Fraser Drive System Design
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12:00	> RDE Testing for the Future. Digital Transformation and Realtime-Simulation of Real Driving Emissions and Fuel Consumption C. Poetsch, F. Pfister, J. C. Wurzenberger, F. Le Rhun AVL	Knock Mitigation Techniques for Highly Boosted Downsized SI Engines F. Millo, M. Mirzaeian, D. Porcu Politecnico di Torino	Advancement of GDCI Engine Technology for US 2025 CAFE and Tier3 Emissions M. Sellnau, M. Foster, W. Moore, K. Hoyer, J. Sinamon, B. Klemm Delphi	Novel Actuation and Control for a Multi-Speed Powershifting Transmission for Electrified Vehicles A. C.O. Smith, R. Taylor, R. J. Barnes Vocis
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12:30	> vRDE - A Virtual Extension of the RDE Tool Chain H. Mezher, M. Wenig, C. Armbruster Gamma Technologies	Octane-on-Demand as an Enabler for Lowering CO ₂ Footprint of Mobility: From Engine Tests to Vehicle Demonstration and Life Cycle Analysis V. Morel, M. Bedon, V. Gordillo Zavaleta Aramco L. de Francqueville, G. Bourhis, F. Vidal-Naquet, S. Charmasson, S. Dosda IFPEN	Progress in Light-Duty OPGCI Engine Design and Testing R. Hanson, F. Redon, S. Strauss, A. Salvi Achates Power	TRANSCEND - Ultra-Wide Ratio Hybrid DCT S. Nesbitt Jaguar Land Rover
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13:00 > POSTER AWARD CEREMONY

13:15 > LUNCH BREAK

NEW ENGINES INTRODUCTION

Federico MILLO | Politecnico di Torino & Amin VELJI | Karlsruhe Institute of Technology

14:30	> The New Renault 1.0 MPI Engine Ph. Grataloup, A. Jarasse, O. Chambert, M. Cuyeu, D. Dagne, S. Pruski, F. Alizon, B. Gourdel, J.P. Le Lagadec, S. Bauchet Renault
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15:00	> PSA Group's Proposals to Improve the Engine of the Year 2015 & 2016 F. Gouzonnat, S. Dessarthe, N. Goursot, P. Souhaite, S. Izelfanane, S. Le Coq Groupe PSA
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15:30	> Ingenium SI engine - Control strategies to deliver a world-class engine N. Brockley, J. Saunders, M. McAllister, F. Borean Jaguar Land Rover
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CLOSING SESSION

16:00	> Gasoline Powertrains: Fascinating Challenges for Mobility and Environment Patrice MAREZ - Powertrain System Senior Expert - Vice President Groupe PSA
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16:30	> Conference synthesis & Conclusion by the Conference Chairmen Philippe BERNET Renault Erwann SAMSON Groupe PSA
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16:45 > END OF CONFERENCE

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Contact: Molly BOISSIER

molly.boissier@sia.fr +33 (0)1 41 44 93 74





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