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DAY 4 | FRIDAY | OCTOBER 05, 2018

FISITA  
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AUTOMOTIVE  
CONGRESS



2 - 5 October 2018  
Chennai Trade Centre, Chennai, India

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## ELECTRIFICATION MAJOR TREND AT 37<sup>TH</sup> FISITA WORLD AUTOMOTIVE CONGRESS



The 37th FISITA World Automotive Congress has been taking place over the last three days on the theme of 'Disruptive Technologies for Affordable and Sustainable Mobility.' While a gamut of topics encompassing various aspects of automotive technologies and innovations have been showcased and discussed about, one stands out above the rest – Electrification. This fact was experienced at the conference, where a number of modules, components and engineering services focussing on the road towards electromobility were displayed.

### AUTOMAKERS

Most OEMs present at the expo

showcased complete electric vehicles, or different variants of hybridisation. Toyota Motor Corporation displayed its Toyota eQ pure electric vehicle focussing on urban usage. The company also showcased its various technologies developed in-house for the purpose of electrifying or hybridising its product portfolio. It also featured technologies for alternate fuels like hydrogen fuel cell. While General Motors (GM) has currently discontinued sales of vehicles in India, it showcased various products for electrification of its vehicles, which provided an insight into GM's view on electromobility as a form of future

transportation.

Similarly, Mahindra Electric showcased its scalable modular architecture for electric vehicles, which consists of an integrated under-floor battery pack, electric motor and electronic systems. This architecture can be used to develop multiple vehicle types due to its scalability as well as choice of motor and battery capacities. Mahindra Electric also displayed its full-electric two-seater last-mile connectivity concept vehicle – UDO, which features one seat behind the other, removable battery, complete controls on steering wheel and compact exterior design.

### SUPPLIERS

The fact that electrification is an important trend for future mobility was reiterated by the solutions showcased by a number of Tier I suppliers and engineering service providers as well. Companies like Bosch, Continental, ZF, TVS Group as well as a number of simulation and product development software providers brought to the table components and solutions specific to electrification and hybridisation of vehicles.

### ROUND-UP

The showcase of technologies and products around electric and hybrid electric vehicles brought to the forefront the fact that electrified powertrain will definitely be the future of mobility. The only question is how much of electrification will enter the vehicle, and how soon. ■

### FISITA UPDATES

For regular updates on **FISITA 2018**, please log on to [www.autotechreview.com](http://www.autotechreview.com)

# FUTURE OF MOBILITY TO SEE A MIX OF TECHNOLOGIES BASED ON MULTIPLE VARIABLES

The TVS Group is one of the largest automotive groups in the country involved in dealerships, parts manufacturing, distribution, logistics, finance and two-wheeler manufacturing. The company is the title sponsor of the 37th FISITA World Automotive Congress. Lucas-TVS is one of the group companies, and a leading supplier of automotive electrical products like starter motors, alternators, wiper motors, ignition product as well as electric motors.

Auto Tech Review met up with **Arvind Balaji, who is the Joint Managing Director of Lucas-TVS, and Managing Director of India Nippon Electricals**, to know more about the company's solutions updates and views on FISITA. He is responsible for all strategic and key operational decisions of both companies, and is also a member of the Board of Directors of Lucas-TVS, Lucas Indian Service and Delphi-TVS Diesel Systems. Balaji has been in the Group since 2004, and is the past President of the Automotive Component Manufacturers Association (ACMA). He has completed his MBA in finance from the Wharton School, University of Pennsylvania as well as holds a Master's degree in Manufacturing Systems Engineering from Stanford University.

**Please provide your perspective on the importance and relevance of the FISITA World Automotive Congress.**

**Arvind Balaji** \_ FISITA 2018 World Automotive Congress in India has been timed appropriately by being in the right place at the right time, especially with so much change happening in the automotive industry, and emerging markets being the centre of growth of the automotive industry. It is good that we're having an engineering conference in India because that is where the future gets absorbed. I also believe that emerging markets will have their own variant of solutions, and not just copying what is in the global industry. So in those circumstances, engineering carried out in India for India-like markets is very important and I'm happy that the conference is held here. This is also one of the reasons why we chose to be the title sponsors as a Group, since our theme has been in designing and



(L-R): Shreeranga, President, Lucas-TVS; Arvind Balaji, Managing Director, Lucas-TVS and Babu Raj, Sr General Manager - Marketing, Lucas-TVS

developing for Indian and similar markets, using Indian engineering talent. Our group is specifically focussing on traction motors, electrification and electronics, which is similar to developing solutions for the domestic market as well as India-like markets.

I hope this congress leverages Indian engineering talent to develop products for the country and similar markets. We have seen that some of the products manufactured in India are some of the most cost-effective ones, while not sacrificing on quality and performance. It has also been observed that more and more companies have set up their engineering centres in India to take advantage of that quality.

**What is your take on this event's theme of 'Disruptive Technologies for Affordable and Sustainable Mobility?'**

The technologies of autonomy, connected, shared and electrified gel with the overall theme of the FISITA Congress. We know that electrification is coming, and it is

only a question of time. In terms of connectivity, everybody is connected already and automakers are trying to do more integration of cell phone solutions. Autonomous driving is yet to be determined and we will have to wait and see how this path is paved. However, there will be some assistance systems catering to safety support in the future. Sharing is a form of mobility that is prevalent across the country, and I truly believe that it is very natural for India. In addition, the growth in urbanisation and consequent congestion will require more sharing and public transport, making India a test ground for this new mobility model. India will also need shared mobility to be able to manage the growing vehicle numbers on the roads.

**How is the TVS Group working on solutions focussed towards future mobility?**

Brakes India Ltd develops braking systems that play a role in the autonomous driving area. Meanwhile, DelphiTVS, Lucas-TVS and Turbo Energy Ltd are all working on alter-

nate powertrain solutions, especially electromobility for future transportation systems. In line with its entry into the electrification space, the company will be launching its traction motors in the next couple of months. We are also expanding our range of motors for other applications also and are quite excited about that direction.

**What is your view about the future of the internal combustion engine?**

I think it is going to be a mix of powertrain technologies in the industry, especially with the fact that a number of regulations like BS VI and CAFE still need to be adhered to. At the same time, there is a need to introduce electrification also. Therefore, I see a future that will have a mix of traditional internal combustion engines, electrified powertrains and alternate fuels also. However, what combination it evolves into will be determined by factors such as technology, global oil prices, trade barriers, customers and many other variables. ■

# Lucas TVS DRIVEN



E - Auto Motor



E - Rickshaw Motor & Controller



48V E-Motor For Electric 2W



BSG for Car / SUV



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*We strive to augment our technology expertise and offer you unmatched reliability. To this end, we ceaselessly innovate.*

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## LDRA Showcases Automotive Functional Safety Offerings



LDRA, a pioneer in the process standard implementation for safety and security critical applications, is participating at the FISITA 2018 World Automotive Congress. The company's tool suite is into automated code analysis, embedded software testing, software functional safety, and process

standard compliance implementation for business-critical markets and applications. Headquartered in the UK, LDRA carries over 43 years of experience in providing verification and validation tools adhering to process standards for diverse verticals like automotive, aerospace and defence, medical, industrial & energy, and railway. The company traces requirements through static and dynamic analysis to unit testing and verification for a wide variety of hardware and software platforms. LDRA provides a unique environment that

helps teams accelerate testing of real-time systems and deliver mission, time and process standard-compliant software on time.

At the 37th FISITA World Automotive Congress, LDRA is presenting its core capabilities and offerings in areas of automotive functional safety and security implementation as well as certification. The company has all the right tools and in-house capabilities, which helps customers in the successful implementation of functional safety standards (like ISO 26262) and SAE J3061, embedded testing, and product certification consulting for safety and business critical applications.

The company's software tool suite assists in the areas of requirement traceability; static analysis on code; dynamic analysis on target microcontroller; and requirement verification and requirements-based testing. LDRA is showcasing products and services around solutions focussed on automotive functional safety process standard (ISO 26262) implementation and automotive cyber security for the cyber physical vehicle standard implementation (SAE J3061). The LDRA consulting team could help customers (Automotive Tier -Is/OEMs with their training, gap analysis and compliance service for safety plan, assessment plan, safety manual, diagnostic test and safety audit.

LDRA provides solutions that comply with SAE J3061. Shinto Joseph, Director – SEA Operations, LDRA, presented a keynote paper on “Emerging Regulatory Standards Framework for Automotive Functional Safety and Security,” at the 37th FISITA World Automotive Congress.

## ESCRYPT Exhibits Solutions for Automotive Cyber Security



ESCRYPT is a leading provider of cyber security solutions that cover the entire automotive lifecycle as well as the backend infrastructure. The company collaborates with its customers at every stage of the product lifecycle, starting with the design phase, continuing through development, production and operation, right up to the system's end of life. It also provides comprehensive advice and training to assist customers as they integrate their security processes and functions into their existing structures to ensure thorough protection against risks, the company stated.

ESCRYPT is headquartered in Germany and all has operations in the UK, France, Sweden, the US, Canada, India, China, Korea, and Japan, where its experts are concentrating on various security topics related to automotive security, V2X connectivity, IoT security, and Industry 4.0

The company claims that its security solutions are the most reliable for protecting connected vehicles against cyber-attacks. Such vehicles will have to take into account every possible risk scenario that might conceivably occur during the entire lifecycle of the vehicle. ESCRYPT's Intrusion Detection and Prevention Solution provides reliable protection against cyber-attacks on vehicles. The central embedded component of this turnkey solution, CycurIDS, recognises anomalies in in-vehicle communication, based partly on known attack patterns and partly on comparisons of the current communication to the anticipated communication behaviour. Thus, CycurIDS provides powerful real-time detection to prevent malicious communication from reaching the vehicle's safety-critical systems without being recognised. CycurGATE, the firewall for various in-vehicle network technologies (CAN, Ethernet) can easily be integrated into existing systems and blocks attempts to send commands to individual ECUs or to the entire network, based on communication policy enforcement, i.e. white list-based approach (allowing only explicitly described communication flows) amended by black listing (to prevent known attacks). As an

intrusion prevention measure the relevant rule set of the firewall can be updated with new and revised rules, the company noted.

CycurIDS detects the security events on a single automobile where as CycurGUARD enables data analysis from the entire connected fleet to identify emerging threats. With the monitoring back-end product based on big data analysis technologies, ESCRYPT offers an integrated solution for collecting and analysing anomaly reports of vehicles in operation. CycurGUARD reliably identifies acute threats referring to an extensive and continually growing database of known attack patterns. Using ad-hoc or pre-built reports helps evaluate the safety and security of the connected fleet, identify changes, focus resources on problem areas, and get ahead of developing threats.

For the comprehensive protection for the entire product lifecycle, ESCRYPT's services are largely divided into following major categories - security analysis, design, specifications, implementation, and testing. These services are backed up by security credential management and security operations solutions. A comprehensive protection for the entire product lifecycle starts from security analysis that lays the foundation for a secure product. Since long product lifecycles often require responding to new security risks, the company helps customers determine the security assets to be protected, identify potential attacks and attackers, and define the appropriate security requirements for all critical security risks. ESCRYPT also provides support in creating the security design for all the hardware and software security components needed for the architecture as well as in designing any necessary security infrastructures and processes. The resulting specifications are tested to ensure that they meet protection requirements and, if needed, optimised once again, the company added. ESCRYPT also provides support during the production phase and once security-critical products have been deployed in the field.

## ATS Puts Cutting-Edge Testing Solutions On Display



Automotive Test Systems (ATS) showcased its cutting-edge testing solutions at the 37th FISITA World Automotive Congress at the Chennai Trade Centre in Chennai. Established in 2004, the New Delhi-headquartered company brought out on display its automotive testing solutions in areas of vehicle dynamics, durable testing, powertrain/emission testing, noise vibration & harshness, SIL/MIL/HIL/VIL simulation, passive/active safety, end-of-line testing, electric & hybrid vehicle & battery testing, test rig development, etc.

Under vehicle dynamics, ATS offers Steering Robots – AB Dynamics,

Steering Robots – Stähle, Pedal Robots, Gear & Clutch Robots, L350 Optical Speed Sensor, S350 Optical Sensor for Speed and Slip measurement, SPEEDBOX mini- Speed Sensor, WPT- Wheel Speed Sensor, MSW- Steering sensor, RV-4- Wheel Vector Sensor, Height Sensor, Wheel Force Transducer, INS & GNSS Based Systems and Data Loggers. As part of its passive safety portfolio, the company offers cameras such as High Resolution High Speed Cameras, SpeedCam MegaVis mini-series and SpeedCam MegaVis HS 2 as well as sensors such as - KiDau Advanced and KiTimerKiTimer – Airbag Timer with 16 ignition Outputs along with Airbag Testing. As far as electric and hybrid vehicles are concerned, ATS provides testing solutions to many OEMs as well as certifying agencies like the Automotive Research Association of India (ARAI) and Central Institute of Road Transport (CIRT).

S Ramanathan, Managing Director, ATS Group, said, “ATS has brought in a lot of technologies at the 2018 FISITA World Automotive Congress in vehicle dynamics, Advanced Driver Assistance Systems (ADAS), electric vehicles, autonomous vehicles, emission which are currently hot topics in the automotive industry.”

Ramanathan stated that a platform like the 2018 FISITA World Automotive Congress serves as a huge opportunity for companies to talk directly with the engineers who have congregated at Chennai. “2018 FISITA World Automotive Congress has facilitated a direct interaction with the engineers – it gives us an opportunity to showcase what we can offer to them and what solutions we have to meet their testing requirements. All in all, ATS serves as a one-stop destination for all testing requirements of the automotive industry.”

## FEV Showcases Teja Handy E-auto



Germany-based FEV Group together with MLR Auto showcased the Teja Handy e-auto at the 37th FISITA World Automobile Congress at Chennai. As part of this joint initiative as a technology partner, FEV converted a diesel fuel-powered auto into an electric auto within a timeframe of three months for MLR Auto. The Teja Handy e-auto is powered by a 48 volt battery that leverages the motor of an AC induction motor of 4.5 kilowatt coupled to an existing transmission and also has a battery swappable option. The Teja Handy has a battery range 100 km and its maximum speed is in the range of 55-60 kpmh. The GVW of the Teja Handy is 9 tonne, while the kerb weight of the e-auto is 350 kg and the payload of the newest offering is 500 kg.

Upendra Paluri, Senior Manager – Business Development, said the cost of operations per kilometre for a diesel powertrain is Rs 5, while the cost of operations per kilometre for an electric powertrain is Rs 1, which makes it an attractive proposition for customers. Paluri stated that the Teja Handy ensures emission-free, noise-free and much-needed comfort coupled with its ability to reach peak torque with an AC induction motor quickly.

The FEV official said electric mobility is poised to trigger a new dawn in the Indian mobility space with three wheelers most likely to embrace the electric vehicle router faster than any other segment.

The Teja Handy is expected to be commercially rolled out by MLR Auto later this year – it will cater to the light commercial vehicle segment across the country.

## Adient Showcases Seating Solutions

Global automotive seating manufacturer Adient is offering its solutions at the 37th FISITA World Automotive Congress in Chennai. The company that develops its products at its state-of-the-art plant at Pune said it is also available for codevelopment with OEMs. Adient's SEA lightweight seat structure has recently joined its portfolio as a ready-to-sell product and is a custom-engineered lightweight front seat core structure for India and Southeast Asia markets for 2020 and beyond. The modular frame architecture enables standardisation to reduce complexity across vehicle platforms with local materials. This versatile family of structures can be easily adapted to customer requirements as the structure is designed with local material availability in mind, the company noted.

SEA leverages Adient's global core competencies to achieve cost-effective vertical integration. The structure is available in four-way (slide and recliner), six-way (slide, recline and height adjuster) and eight-way (slide, recline, height adjuster, cushion tilt) options and is scalable to higher complex variants as well.

Adient also has developed a concept named AIS1 Demonstrator, which is the first India-developed future mobility seating concept that showcases a range of innovative seating solutions tailored to the region. The concept addresses the need for efficient design and cost-effective lightweighting with its use of modular structures and new generation mechanisms. It is custom-engineered India and Southeast Asia lightweight structure as well as third generation height adjuster, GLR, GTS manual track, PHA2000, T3000 and GTS power track along with features like integrated armrest console with seat controls and wireless charging. This regional seating concept targets the B+C Mini S/CUV segments for India and Southeast Asia in 2025.



# FISITA RELEASES WHITE PAPER ON “MOBILITY ENGINEER 2030”

Released on the second day of the 37th FISITA World Automotive Congress in Chennai, the “Mobility Engineer 2030” white paper outlines how the automotive sector is changing, before considering the evolving needs of industry, drawing on input from corporate members of FISITA and engineering society members through the FISITA Industry Committee and Technical Committee.

The paper then explores how the role of education can adapt, outlining the views of the FISITA Academic Advisory Board (AAB) and Education Committee, both of which consist of leading academics and scientists from world-class universities, extending a reach across three continents. The input of the AAB and FISITA Education Committee provides an excellent insight into current education models, best practice and future considerations.

The report then proposes a concept for the future by combining input from the multiple stakeholders aligned through FISITA; the inaugural Mobility Engineer 2030 White Paper aims to support further progressive discussions, considerations and thought leadership as industry and academia prepares the environment for the next generation of our industry’s technologists; the ‘mobility engineers’.

We bring you excerpts from the white paper:

## How Automotive is Changing

Current developments in mobility engineering are increasingly volatile. Many things happen simultaneously and it is crucial to maintain the overview. In this section we would like to offer three independent inputs that might be able to provide some insight. There is no aim to provide a complete picture, however, a discussion about future education of engineers does require a vision about the future technology demand.

### Four Disruptions:

- Electric traction: eco-system including non-automotive infrastructure. This includes renewable energies and smart grids.
- Automated driving: robotisation with high level of safety/ security. This includes artificial intelligence, machine learning and formal methods to provide the required

level of safety.

- Connected cars: eco-system with telco technologies and business model. This includes standardisation of protocols, bandwidth, cybersecurity, etc.
- Mobility on demand: new services with partnership with public authorities (city, etc. . .). Access versus ownership, new business models, diverse partnerships.

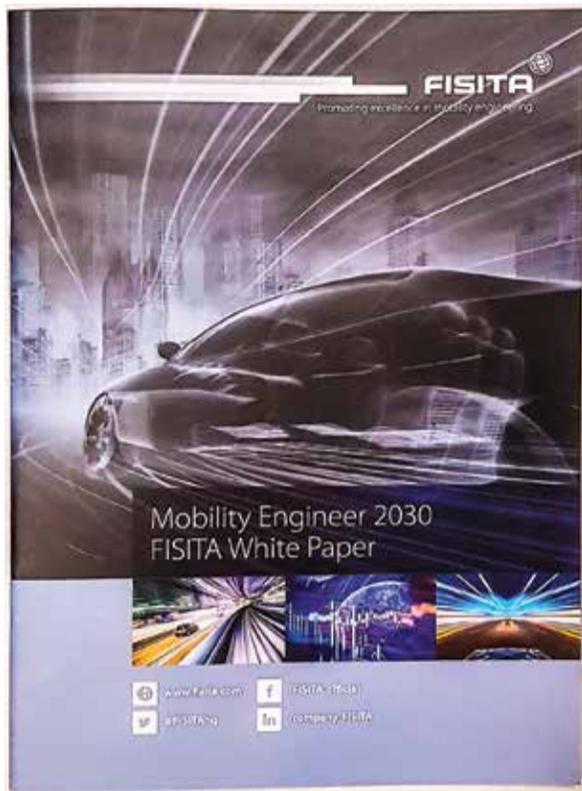
### The Demands of Industry

In view of the fundamental changes in the automotive industry driven by digitalisation, electrification and societal trends, the Mobility Engineer 2030 initiative asked FISITA’s corporate members two fundamental questions:

1. What type of engineers will your organisation need in the future?
2. What are the future industry requirements in terms of engineering expertise, skills and abilities?

*Their collated response can be summarised as:*

- III. The engineering landscape in the automotive industry will broaden in scope - in addition to mechanical engineers, companies will be in significantly greater need of engineers from IT and associated ‘new technology’ disciplines;
- IV. Besides specialists, the industry will require generalists with capability across different engineering disciplines that link the various engineering fields, and engineering collaboration across multiple disciplines will become critical success



factors for engineering in the future; V. In parallel, the skillset of engineers will expand from predominantly technical requirements to more process-related skills, such as agile project management, communication skills, operating in virtual environments, and flexible organisations will become important competencies in the engineering role profile.

### Technical and Interdisciplinary Skill Requirements

Feedback from FISITA corporate members shows that traditional science, technology, engineering and mathematics (STEM) skills will remain an important part of the skills mix. Respondents unanimously confirmed that the ‘classical’ automotive engineer with profound knowledge in mechanical engineering, mechatronics and materials will still be necessary.

However, in the context of electrified, connected, autonomous and shared mobility, the qualification profile of a ‘universal’ engineer with a deeper understanding of other engineering disciplines will gain increasing importance. In general terms, companies anticipate a shift in requirement from a pure mechanical engineer profile towards a mixture of mechanical and electronics or mechanical and software engineer profile.

Respondents noted, for example, that a mechanical engineer must

have a robust knowledge of electrical/ electronic systems to lead detailed discussions with their counterparts in cross-functional teams. They also highlighted a growing need for engineering specialists in the fields of data networks, electrical engineering, software engineering, software architecture and systems, digital signal processing, and in the increasingly important technology areas of cybersecurity, artificial intelligence, and robotics.

Several respondents prioritised systems engineering and the increasing complexity of vehicles as crucial in engineering discipline terms, and already becoming a significantly important area. Industry experts see simulation, virtual testing, virtual prototyping and virtual reality as areas with disruptive potential in the automotive engineering process. A rapid increase in model-based development, hand-in-hand with the ability to transfer simulation results into reality, is seen as essential to developing advanced products rapidly.

The evolution of Industry 4.0 (automation and data exchange in manufacturing technologies) and the growing availability of big data, enabling the development of predictive models, are challenging the automotive engineering community to establish competencies in gathering, analysing and working with the large volumes of data being generated by machines and processes engineers, who understand and think in process terms, rather than silo specialists, are required to meet this challenge.

It is therefore suggested that a new engineering species of ‘data scientists’ who are experts in analysing complex data, will collaborate with process experts to quickly make reliable predictions.

In view of the increasing role of simulation and the trend towards remote engineering, industry contributors also highlight a growing need for expertise in ‘manufacturability’. The ability to recognise key factors that impact the manufacturing process very early in the design process is and will continue to be an important asset for engineers, as development cycles get shorter and products become increasingly complex. In this context, detailed knowledge of the appropriate manufacturing processes, techniques and tools will be crucial. ■

# SNAPSHOTS FROM FISITA 2018



AVL displayed a 48 V hybrid powertrain among other technology solutions



IIT, Madras put on display NEOMOTION mobility solutions as well as an e-scooter from Ather Energy



TVS exhibited products of its group companies such as Lucas-TVS, Brakes India, Sundaram Fasteners, Wheels India and India Nippon



Altair showcases future mobility solutions as well as comprehensive electromagnetic analysis and design solutions



Panasonic is showcasing power tools for torque control and is also celebrating its 100th anniversary



SKF exhibited a wide range of bearings



Hindustan Group of Institutes displayed an all-terrain vehicle (ATV) designed and made by its students



FARO exhibited FARO Quantum FaroArm - a PCMM that allows easy verification of product quality by performing 3D inspections, dimensional analysis, CAD comparison, etc



Bettinelli Automation Components showcased a range of rotary manipulators such as MAN10, MAN20, MAN30, MAN40 and MAN50

# MATLAB SPEAKS DEEP LEARNING

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## Mathworks

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