

# We continue to lead with our patented aluminium lightweight technology, delivering our most efficient body on I-PACE



Steel hot stampings riveted to the B-post, **reducing its weight by 5%** compared to conventional aluminium.



94% of the I-PACE body structure is made from aluminium, with a **high level of recycled material.**

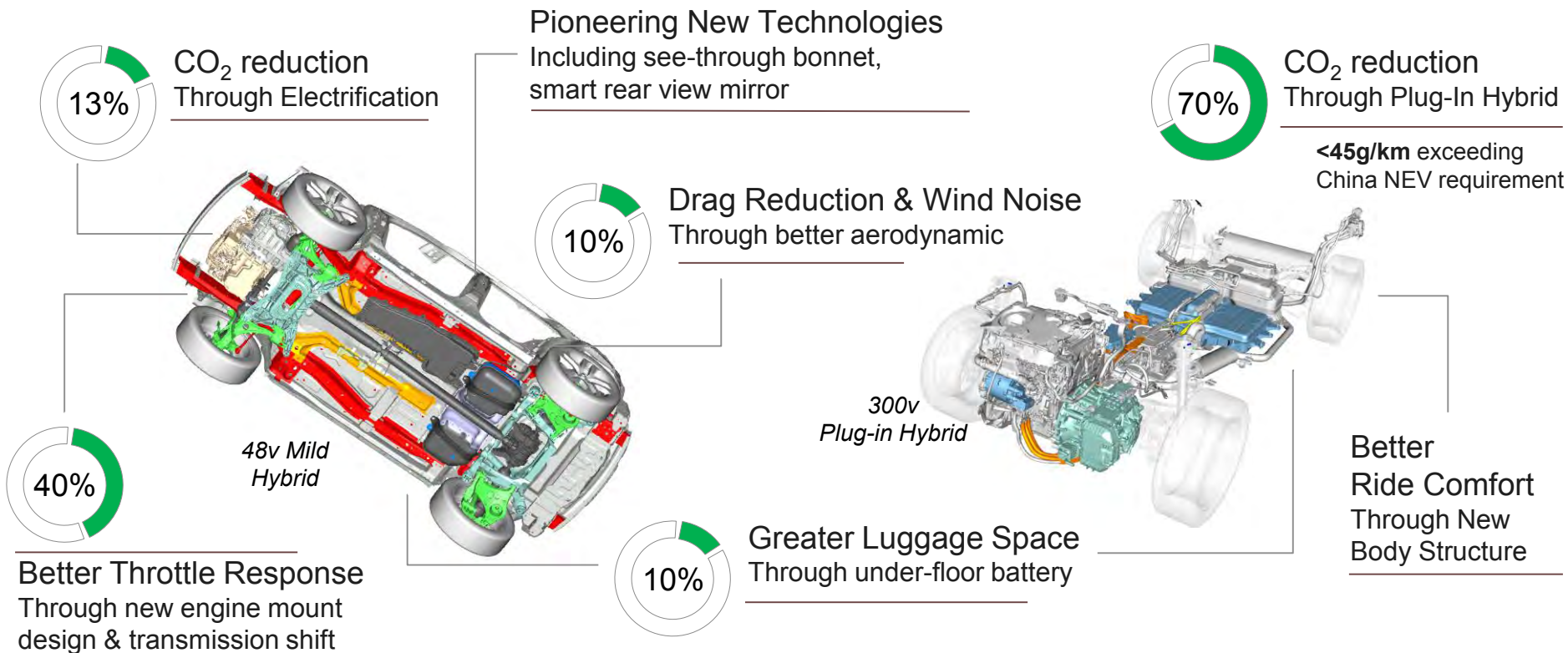
Through efficient engineering and toolsets, we have engineered our most rigid body structure for I-PACE

**The learning and new skills we have gained with I-PACE will be embedded into all our new products**



We are passionate about ensuring our reborn icon is fit for the future

# And this year we are transforming our smaller SUVs with our brand new Premium Transverse Architecture



A full architecture transformation delivers new technology at great scale economies

# All of this learning paves the way for our modular longitudinal architecture

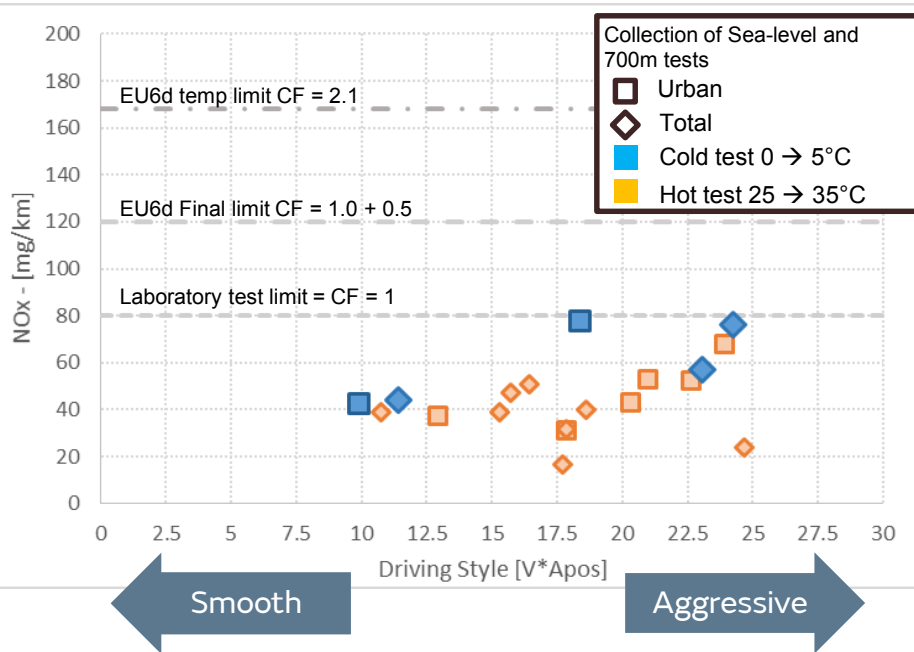


Our scalable architecture is agnostic to propulsion systems and utilises efficiently modular commodities

# In addition to our electrified vehicles, we are continuing to engineer clean diesels



## Tailpipe Nitrogen Oxides ( $\text{NO}_x$ ) performance – mg/km



## Proven across Europe and around the world



Factor	Limit	Tarragona	Guadalajara	Innsbruck	Stuttgart
		Sea Level	700m	700m	250m
Urban Average Speed	15-60kph	18-25	20-30kph	22kph	15kph
Motorway Max Speed	145 - 160kph	120kph	120kph	130kph	160kph
Urban gradient	1200m/100km	1031m/100km	833m/100km	457m/100km	802m/100km
Total gradient	1200m/100km	1214m/100km	1523m/100km	486m/100km	1200m/100km
Altitude difference	100m	185m	3m	25m	100m

Our results today already achieve the 2020 emissions standard



# We are aligned to new Real Driving Emissions (RDE) standards – our technology enables us to meet them



## Testing Requirements



**3000 tests** required  
to certify our 19MY  
vehicles



## JLR Exhaust System Technology

NO<sub>x</sub> and particulate  
sensors  
continually monitor  
emissions

NO<sub>x</sub> Sensor  
measures Nitrogen  
Oxides out of NO<sub>x</sub>  
trap to determine  
correct Urea  
injection quantity

Diesel Particulate Filter –  
removes large particles

Selective Catalytic  
Reduction Brick –  
reacts NO<sub>x</sub> and Urea to  
reduce to Nitrogen and  
Water

UREA Injector

Lean NO<sub>x</sub> Trap – oxidises  
Hydrocarbons and Carbon  
Monoxide, and also captures  
Nitrogen Oxides, releasing  
when optimum operating  
temperature is reached

**98% NO<sub>x</sub> conversion efficiency**

RDE is the most stringent emissions standard to date – JLR have been fitting SCR technology in cars for 3 years

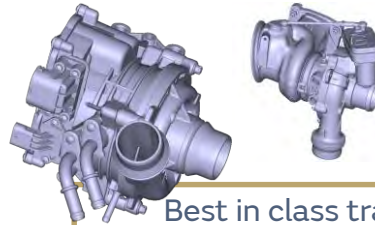
# Our Ingenium gasoline engine family is also already equipped for future legislative challenges



China ✓  
Eu6d ✓  
Sulev 30 ✓



Gasoline Particulate Filter  
to improve real driving  
emissions



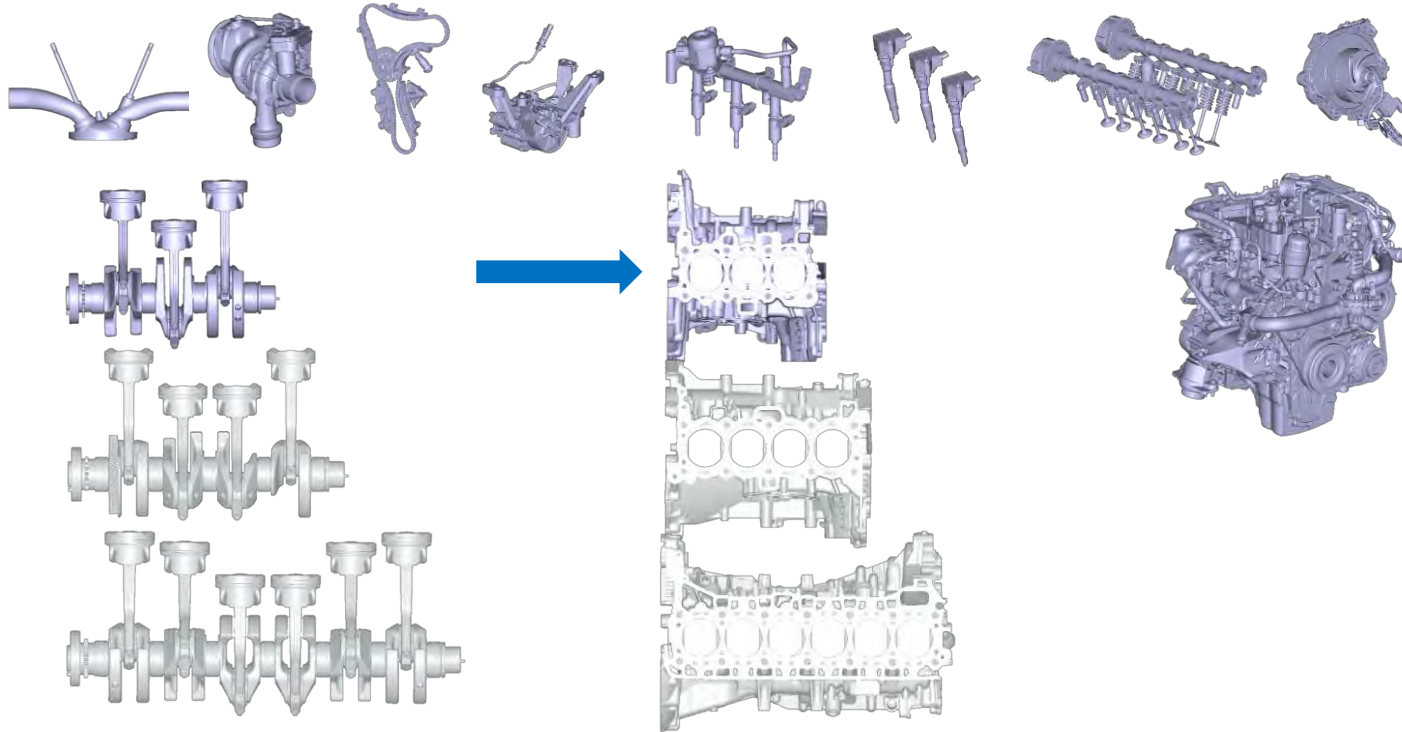
Best in class transient  
performance with electric  
SuperCharger



Fully Variable Lift  
and Timing Electro-  
Hydraulic Valve Train

Efficient combustion engines and new technology deliver customer focused attributes, fit for the next decade

# Our modular engine architecture enables efficient engineering, shared technologies and complexity reduction

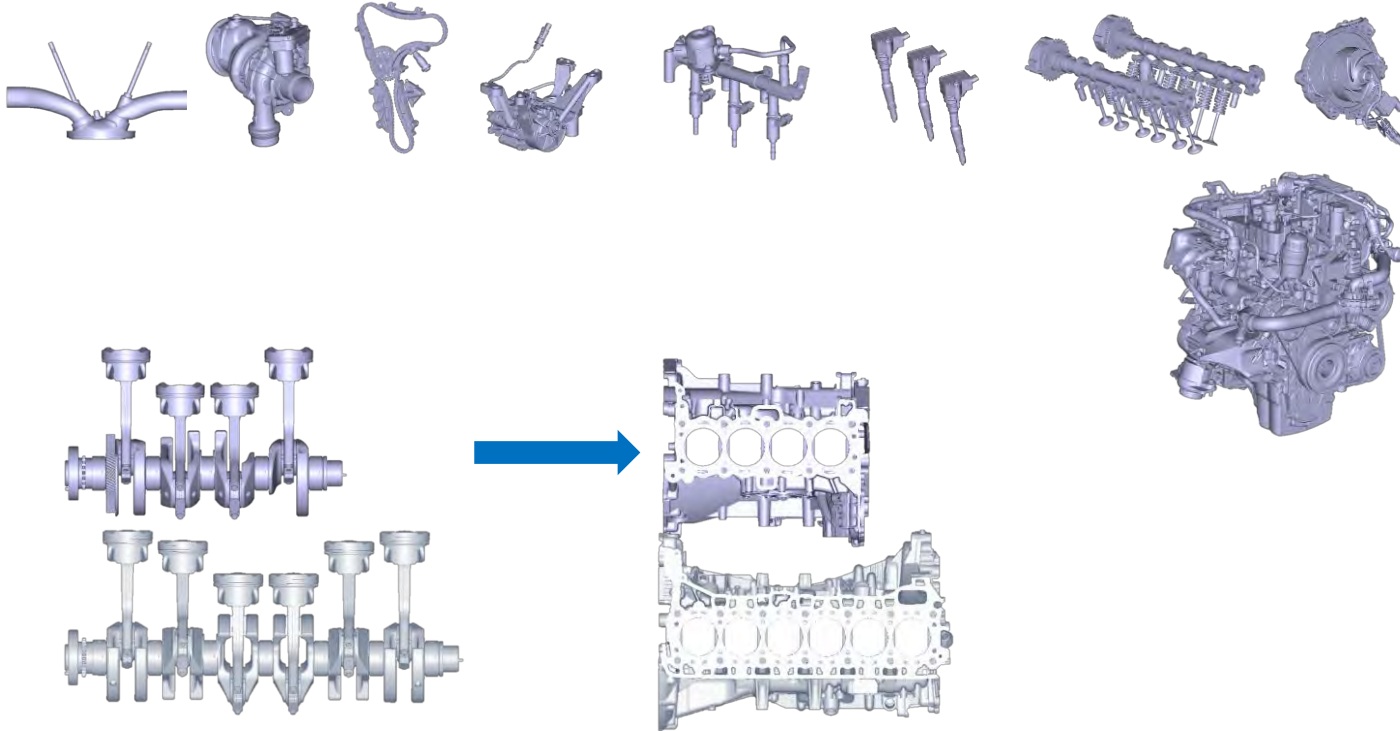


Common Ingenium  
Technologies

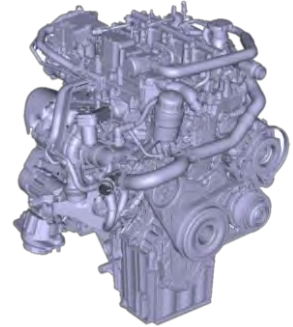
By reusing parts and processes, we are able to focus our efforts on innovative new technologies



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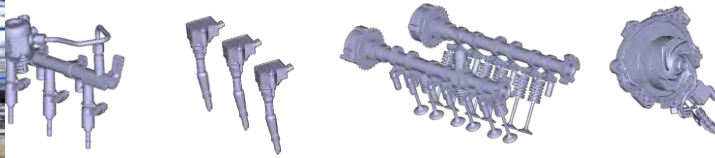
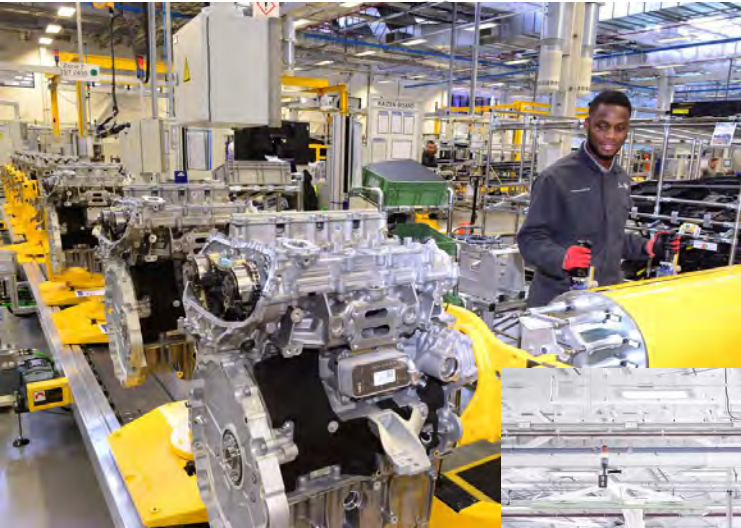


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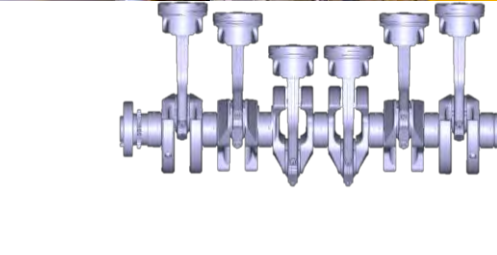
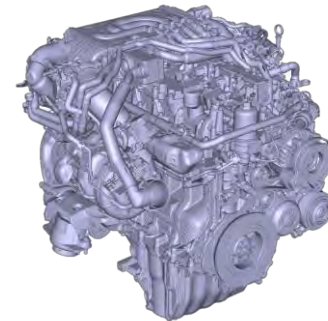
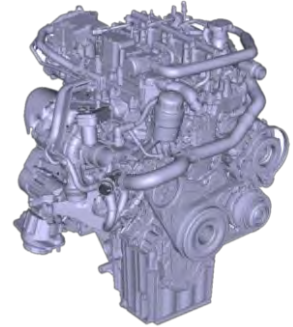
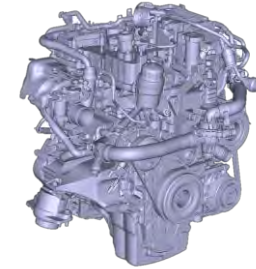


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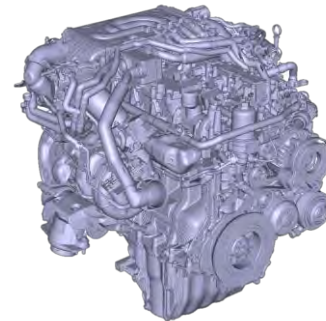
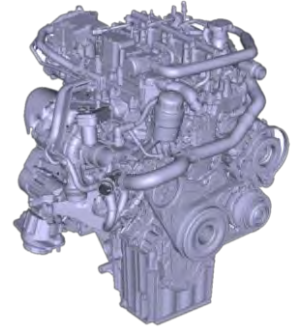
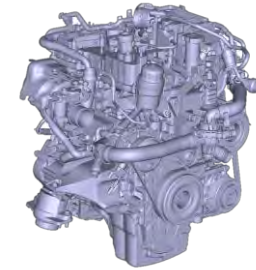
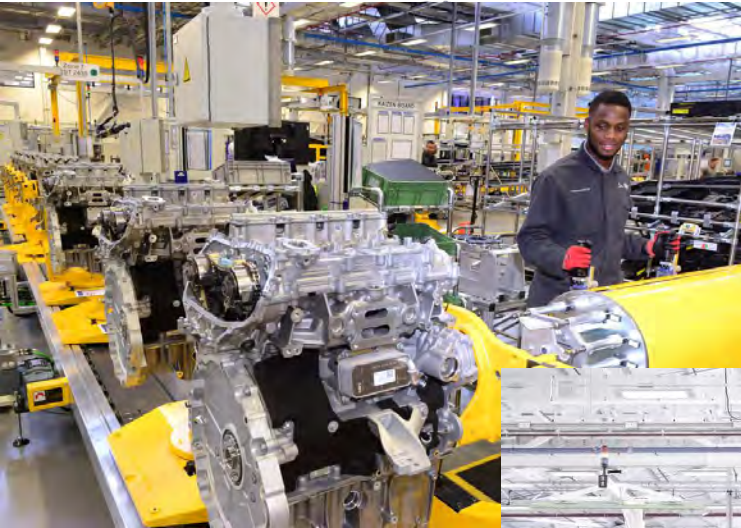


Common Ingenium  
Technologies



We have set up our flexible manufacturing facility to enable the most efficient delivery of propulsion systems

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# We are committed to efficiently engineering software for our pioneering products



**Traditionally** ECU hardware and software have been tightly coupled

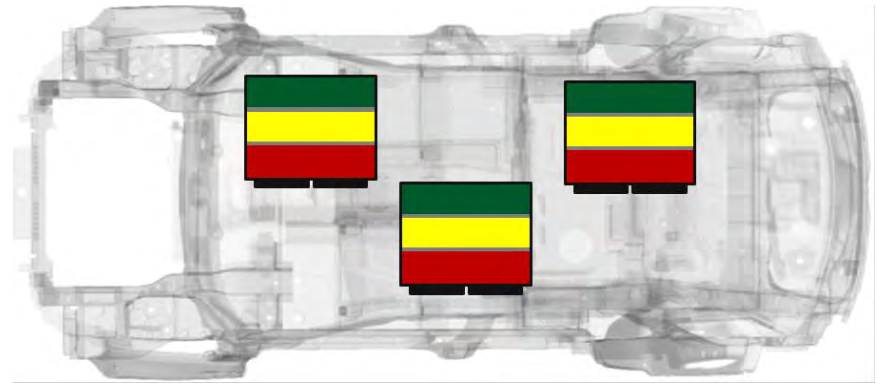
Software produced by individual ECU suppliers



Duplication of software in the ECUs drives up to 200 million lines of code in each car

Inefficient duplication and redundancies drive expensive supplier costs

**Now** hardware becomes compute module so we reduce the number of ECUs required



We are driving reuse of industry standard software, enabling greater levels of software integration

More efficient use of hardware optimises investment

We have an obsession for fully streamlining our integrated electrical architecture to realise system efficiency

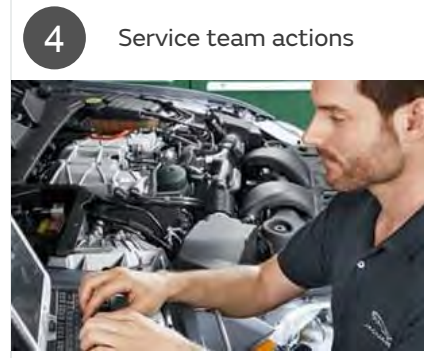
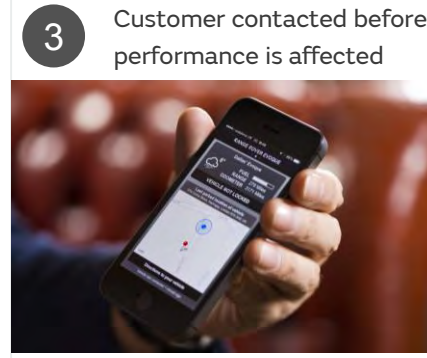
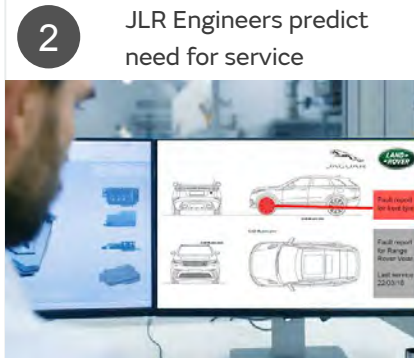
# We are embracing Gen Y trends to pioneer continuous configuration and enhancement for our vehicles



SOTA  
today



Next  
gen


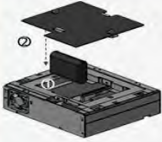












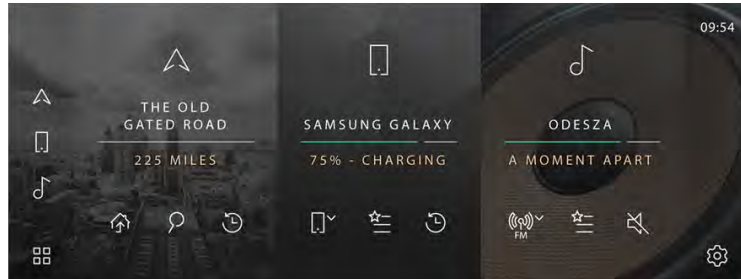
Next generation SOTA enables predicted services and enhancements through continuous updates



# We are learning and taking the next leap with our infotainment systems for our customers



<p><b>Always On</b></p>  <p>Instant start up from low power mode - Back up battery gives 2week standby</p>  <p>Instant connection using embedded SIM with profile management</p> 	<p><b>Always Connected</b></p>  <p>Always connected to 4G network (5G future)</p>  <p>Cloud server back-end provides fully connected experience</p> 	<p><b>Always Listening</b></p>  <p>Full interaction through voice</p>  <p>Multiple key partners for offboard voice, Alexa, Nuance, Microsoft</p> 	<p><b>Always Up to Date</b></p>  <p>Next generation Software over the air (SOTA)</p>  <p>First to market with hardware upgradeable cartridge concept</p> 
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We are applying human science design rules to user interfaces and streamlining system messaging

**It's a changing world...**



**...And we are disruptors**





# GLOBAL PURCHASING

## **PRODUCTION PURCHASING**

IAN HARNETT

EXECUTIVE DIRECTOR, HR AND GLOBAL PURCHASING

**ONE GLOBAL PURCHASING TEAM  
LEADING SUPPLIER PERFORMANCE  
EXCELLENCE TO DELIVER A  
COMPETITIVE EDGE TO JLR**