

Delivering Excellence Through  
Innovation & Technology

A photograph of a car's interior from the driver's perspective, showing the steering wheel, dashboard, and rearview mirror. The image is overlaid with a network of glowing blue icons connected by thin white lines. The icons include a traffic light, a road sign, a car, a smartphone, a heart with an ECG line, a battery, a musical note, and a person. The background is a blurred view of a road through the windshield.

## Mobile Data System Resilience: New Rules, New Risks, New Solutions

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Ricardo Innovations

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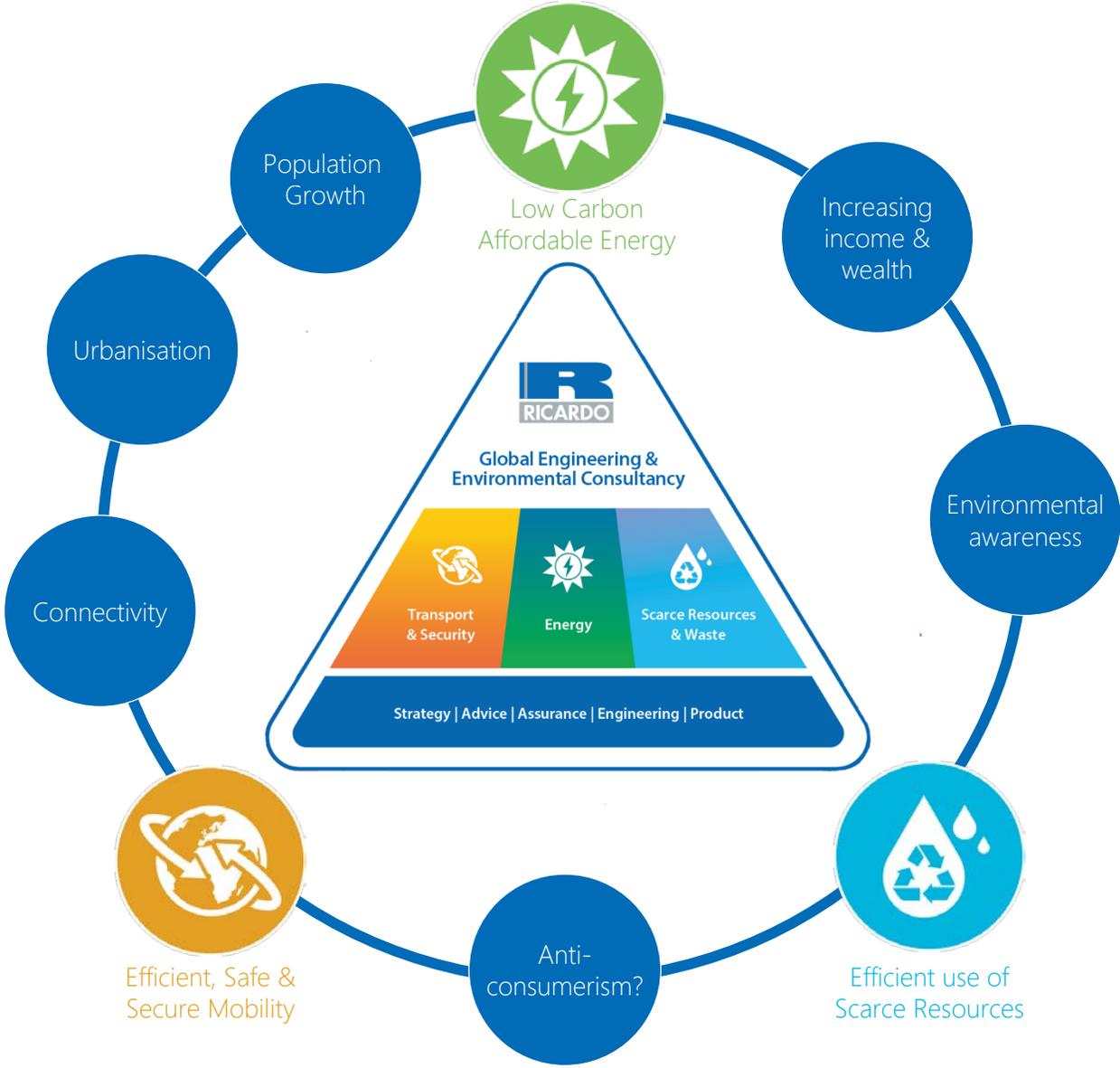
[www.ricardo.com](http://www.ricardo.com)



## Ricardo delivers world class strategy, engineering & technology to government and industry

Our ambition is to be the world's pre-eminent organisation focused on the development and application of solutions to meet the challenges within the markets of Transport & Security, Energy, and Scarce Natural Resources & Waste.

# Megatrends drive three interlinked challenges that drive safe automation and connectivity



# Automation is critical to support EU target to reduce road fatalities 50% by 2020\*



- Enhanced driver feedback
  - In cab and off cab
  - HMI & V2I comms

- Improved vehicle system management and integration
  - Sensing and control
  - Terrain topography
  - V2I topography

- Complete vehicle management integration
  - Sensing and actuator control
  - V2I and V2V comms
  - Autonomous control and strategy

# But what happens if these systems are exploited?

TECH CYBERSECURITY

Hackers are holding San Francisco's light-rail system for ransom



ANDY GREENBERG SECURITY 07-21-15 6:00 AM

## HACKERS REMOTELY KILL A JEEP ON THE HIGHWAY—WITH ME IN IT



“Trustworthiness of ADAS systems is critical for consumers, and further adoption of autonomy will build on our trust in them.”

# Partnerships are essential to ensure digital resilience



Automotive Cybersecurity through Assurance



Vehicle Information	
CO <sub>2</sub> emission figure (g/km)	
< 120 A	A 104 g/km
120+ to 140 B	
140+ to 155 C	
155+ to 170 D	
170+ to 190 E	
190+ to 225 F	
225+ G	

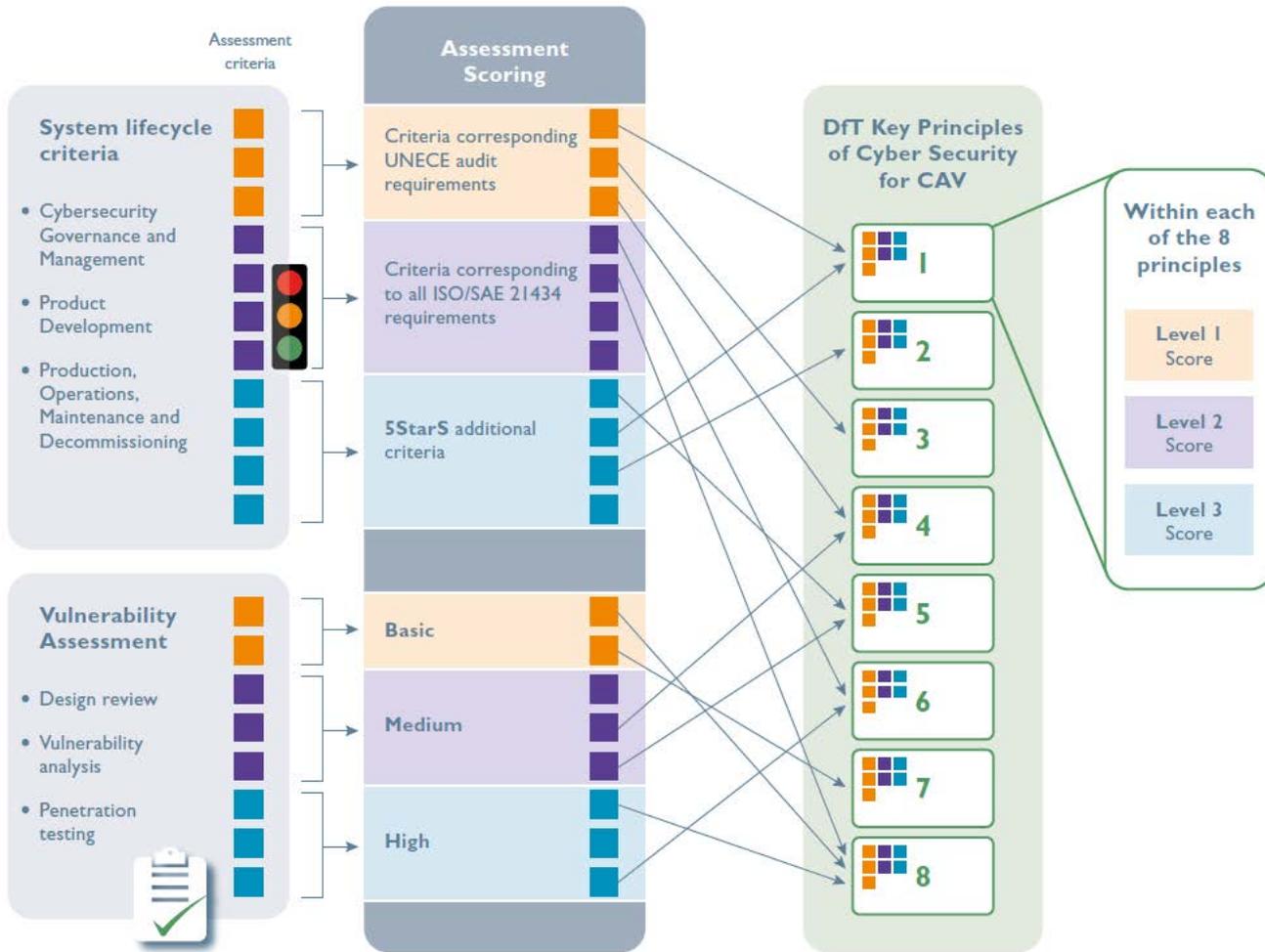


The 5StarS consortium is aiming to develop a consumer rating framework like Euro NCAP's vehicle safety ratings, that will give UK consumers transparency around a car's potential cybersecurity risk

# 5 StarS delivers a qualitative assessment of vehicle cyber resilience



166 ➔ 8



## UK Department for Transportation Cyber Security Principles for CAV

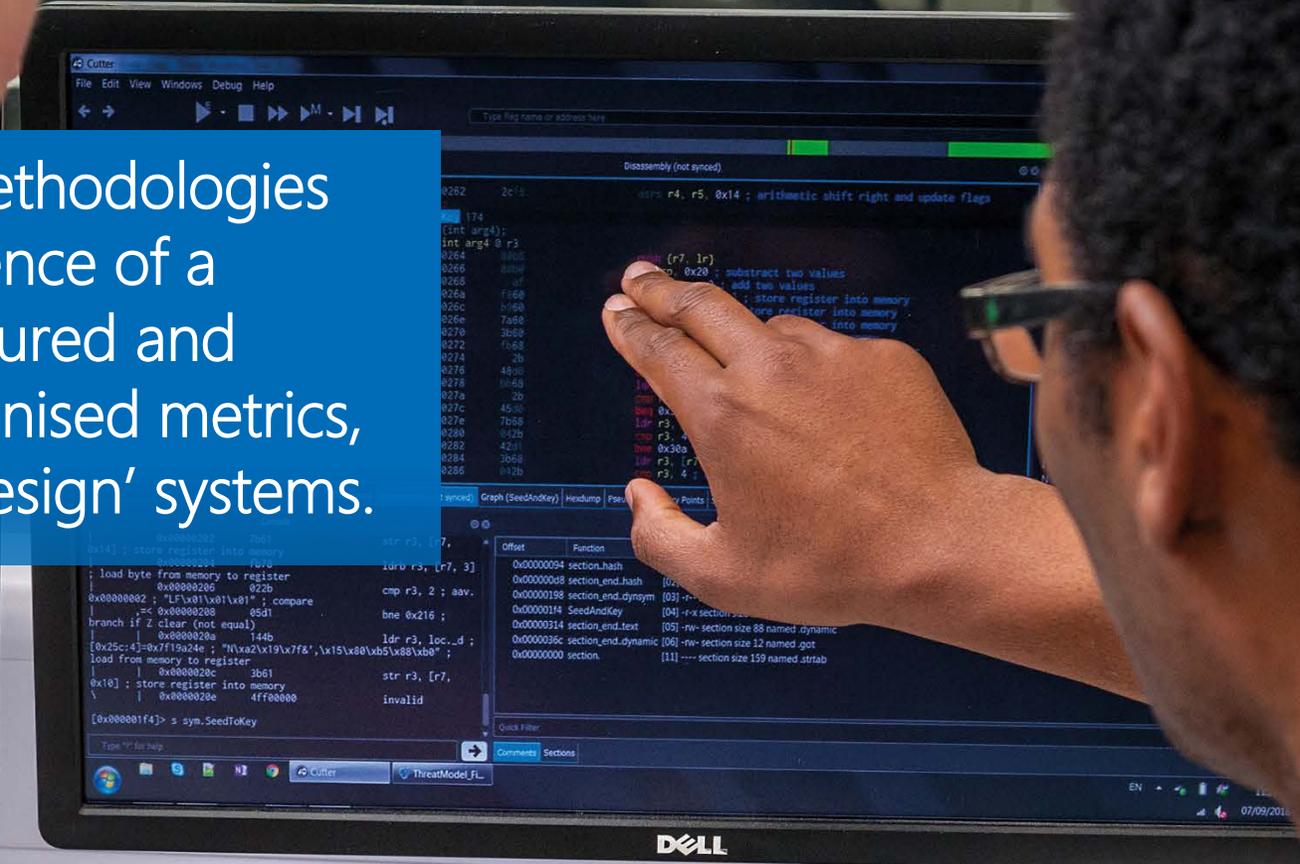
Category	Criteria
1	Organisational security is owned, governed and promoted at board level
2	Security risks are assessed and managed appropriately and proportionately, including those specific to the supply chain
3	Organisations need product aftercare and incident response to ensure systems are secure over their lifetime
4	All organisations, including sub-contractors, suppliers and potential third parties work together to enhance the security of the system
5	Systems are designed using a defence-in-depth approach
6	The security of all software is managed throughout its lifetime
7	The storage and transmission of data is secure and can be controlled
8	The system is designed to be resilient to attacks and respond appropriately when its defences or sensors fail.

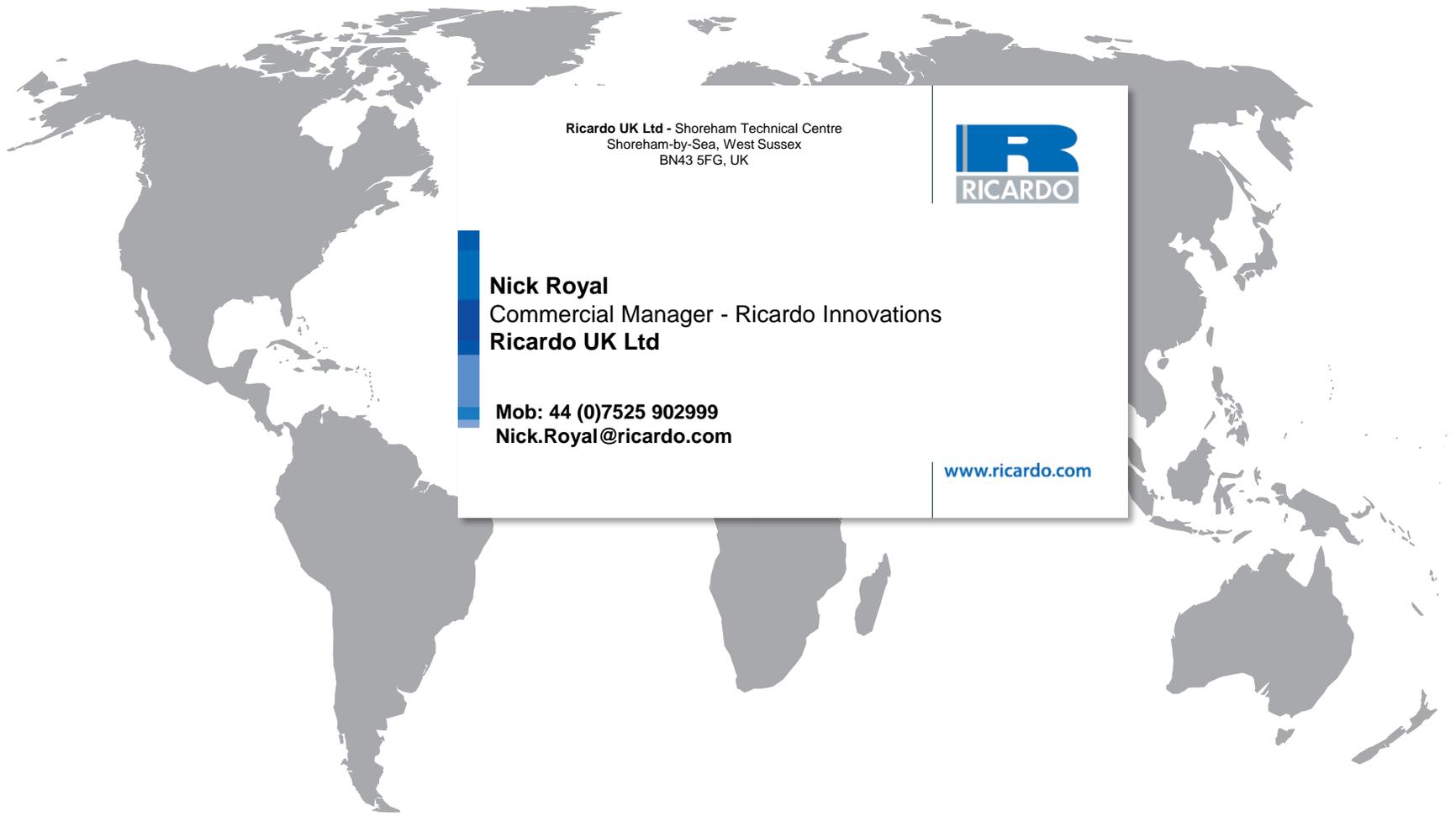


## Digital Resilience Partnership

Roke and Ricardo bring together 160 years of innovative engineering experience to offer a new approach to cyber security across transport systems and the critical national infrastructure which enables the design and development of systems which are “secure by design”.

Our objective is to develop methodologies against which the digital resilience of a vehicle can be assessed, measured and assured against globally recognised metrics, enabling trusted 'secure-by-design' systems.





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