



# INTRODUCTION TO BLUEBINARIES & LIGHTING CAPABILITIES

May 2021

Inspired by Future Mobility

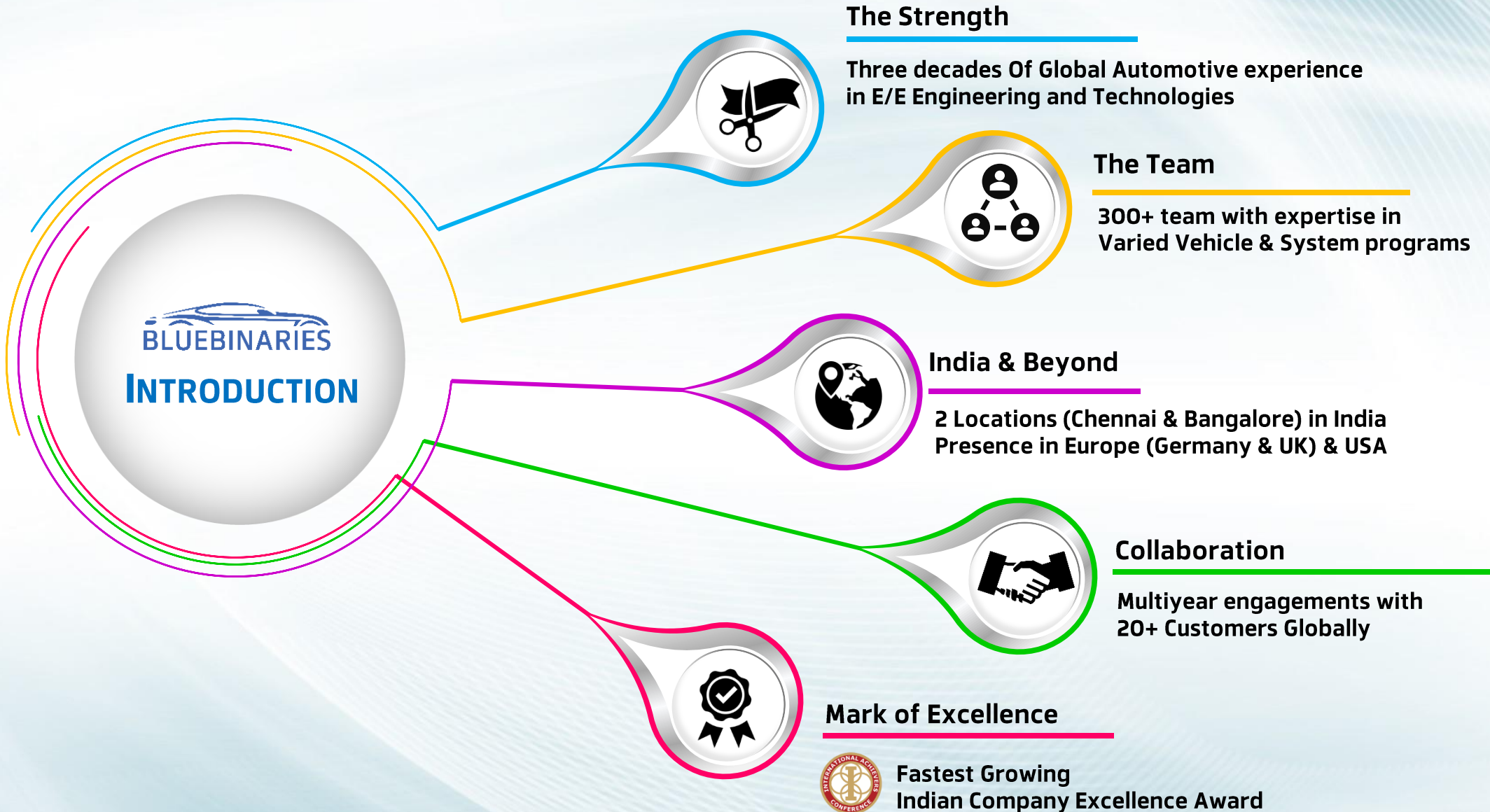


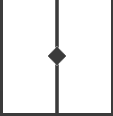
**WE ARE BLUEBINARIES**

**Experts specialized in providing E/E engineering services & solutions  
to Global Mobility Industry solving their future challenges today  
and enabling them to achieve exceptional results**

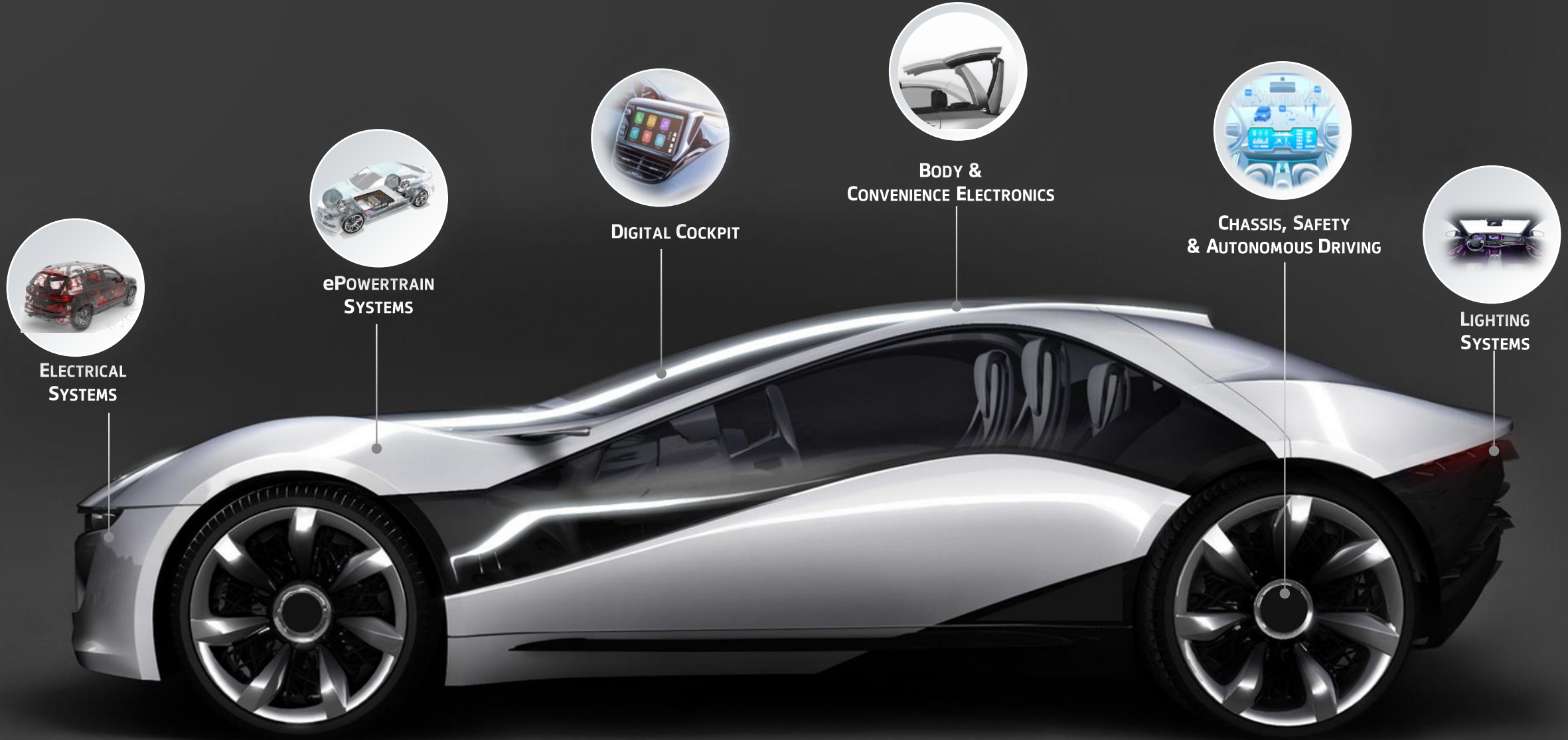








# CAPABILITIES OVERVIEW



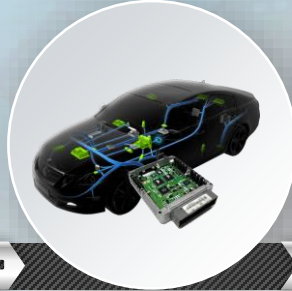


# SERVICE OFFERINGS

## Benchmarking & Value Engineering



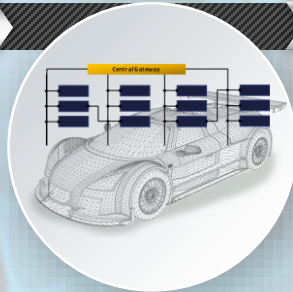
## Systems Design & Requirements Engineering



## Test and Validation



## E/E Architecture Design & Development



## Systems Development (Hardware and Software)



## EOL Systems Design & Development



## Process & Methods Consulting



## Functional Safety & Cyber Security Management







**One Stop  
Lighting System Development  
& Technology Partner  
enabling your Transition  
Into Future Mobility**



# LIGHTING SYSTEM CAPABILITY OVERVIEW





# PRODUCT ENGINEERING CAPABILITY



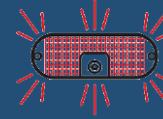
HEADLIGHTS



REAR LIGHTING



DRL & FOG LAMPS



CHMSL



CONSOLES



AMBIENT LIGHTING



## TECHNOLOGY EXPOSURE

- Full LED System
- Xenon Projectors Design
- Adaptive Front Lighting Systems
- Matrix Beam Headlamps
- Sequential Turn Circuits
- RGB Projectors & Modules
- DRL TI PO Tri function Modules
- Overhead Console Board
- RGB Control Module EOL Test bench



## CAPABILITY

- World - wide Regulation library
- Test Specification Library
- Requirement Matrix for Headlamp, Rear lamp & Ambient Lighting
- Ready made Optical and Electronics Solution
- Expert resource in Product, Process, Design, Software and Hardware



## SERVICE OFFERING

- Technology Development
- Product Definition
- Pre-Development
- Product and Project Costing
- Studio Engineering
- RFQ Response support for Tier 1
- Prototyping
- Testing & Homologation
- Turnkey Projects for OEM & Tier 1







# DESIGN ENGINEERING CAPABILITY

## SERVICE OFFERING

- Work as an extended team of system supplier design team
- Work as part of OEM/Engineering service provider vehicle development team
- Work as Offshore design team for proto & series development
- Work as studio engineering team for lighting design studio





# SIMULATION ENGINEERING CAPABILITY

	Capabilities	Tool	Service Offering	
Optical Simulations	World wide regulation Light source Database ECE & FMVSS Experience Process & Methodologies	 	LED Reflector Design Projector Systems Light Guide Design Micro Optics Design	
Mechanical Simulations	Test Spec Library Lessons learnt Process & Methodologies Tool Expertise	 	Resonance Analysis Vibration Analysis Structural Analysis Fitting Simulations	
Thermal Simulations	Test Spec Library Lessons learnt Process & Methodologies Tool Expertise	 	Thermal mapping of LED and bulb version exterior lamps Thermal simulation of motors	
Condensation Simulations	Test Spec Library Lessons learnt Process & Methodologies Tool Expertise	 	Fogging & Defogging simulation for Headlamp & Tail lamps	



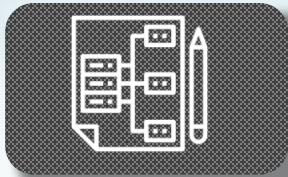




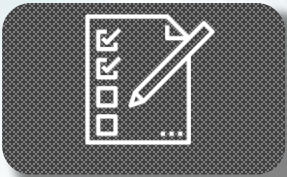
# LIGHTING ELECTRONICS DEVELOPMENT CAPABILITIES



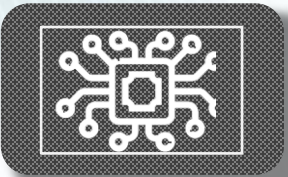
## End to End Experience



System Design



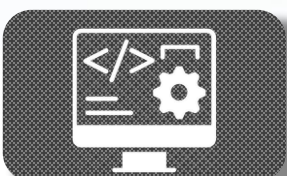
Requirements Engineering



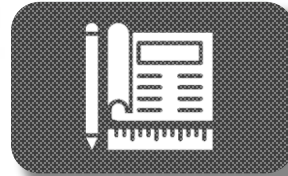
Hardware Design



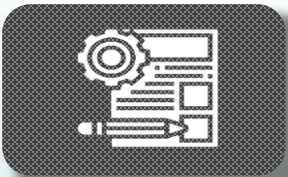
Function Engineering



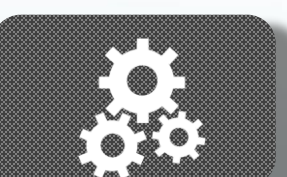
Software Development



Proto Development



Proto testing



SW Integration



Software and System Testing





# VALIDATION & HOMOLOGATION CAPABILITIES

Dedicated Validation Team

Regulation & Test Spec Library

End to End Test Infrastructure

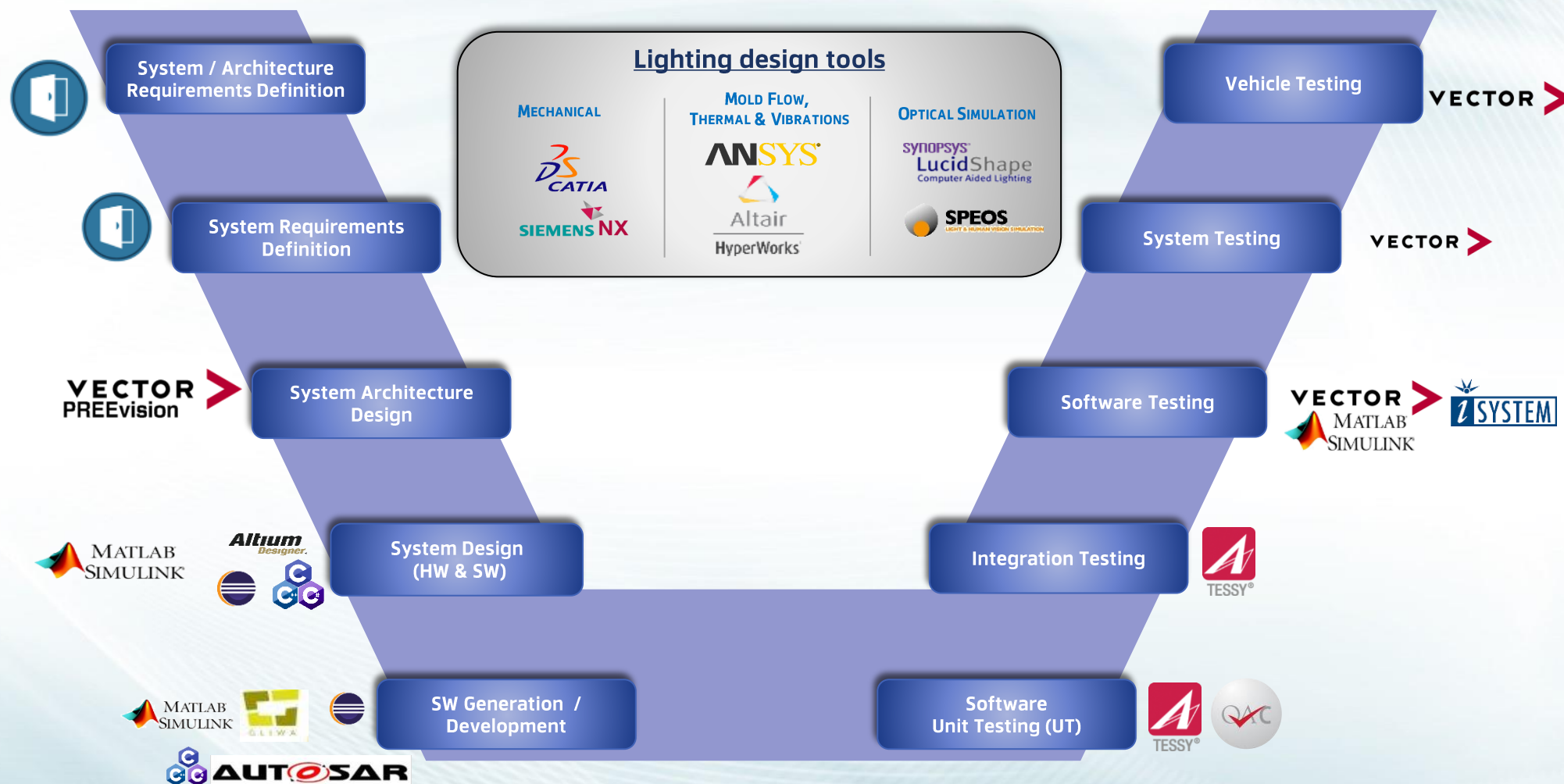
Development testing & Homologation







# SYSTEM DEVELOPMENT AND TESTING TOOLS





## DIFFERENTIATORS & VALUE PROPOSITION

**BLUEBINARIES**  
**Differentiated  
Lighting System  
Development Partner**



### Centre of Excellence

- Complementing capability - Opto-Mechatronics
- Proven processes and methodology
- Experience & Alignment in emerging technologies & future trends



### Cost Competitive design

- Cost-efficiency with offshoring
- Lean & Frugal Development Approach
- Design Libraries based on global standards



### Engagement Agility

- Need specific engagement model
- Quick ramp-up and ramp-down
- Simultaneous Engineering



### Partnership Ecosystem

- End to End capability with partners enabling turnkey projects execution







# BlueBinaries

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