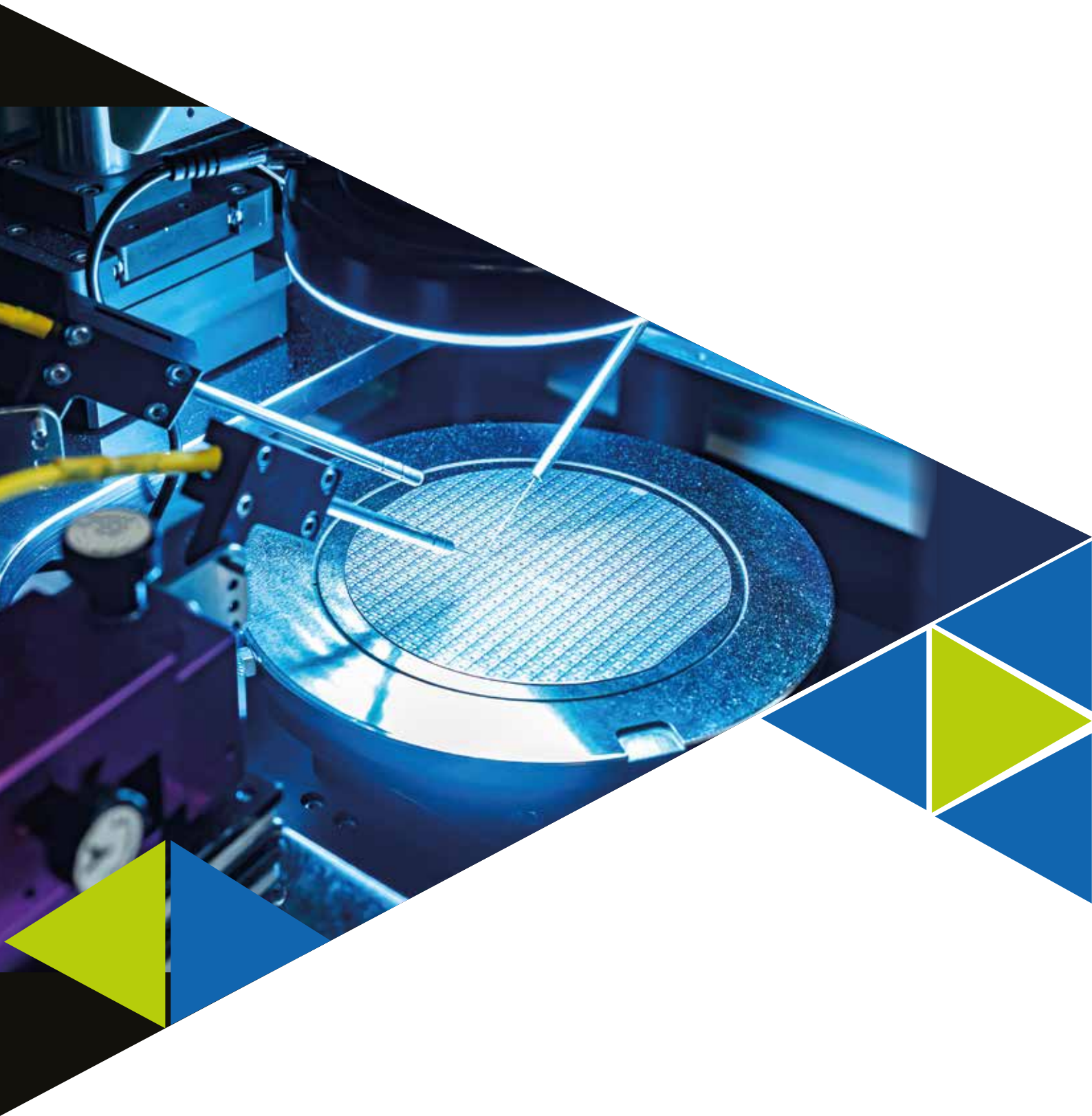


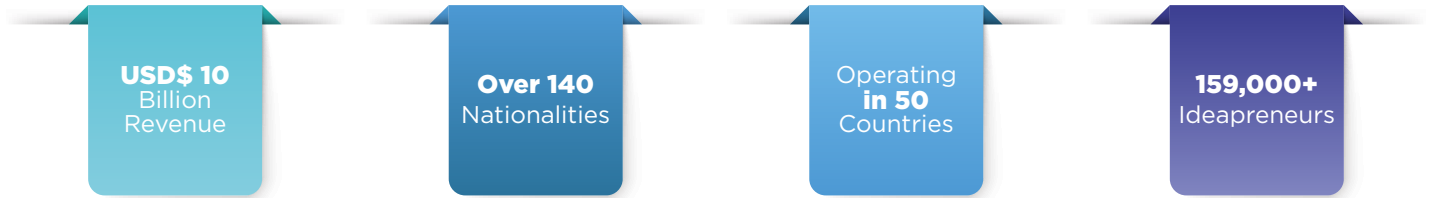
HCL SEMI OEM Services



HCL TECHNOLOGIES

HCL is a next-generation global technology company that helps enterprises reimagine their businesses for the digital age. Our technology products, services, and engineering are built on four decades of innovation, with a world-renowned management philosophy, a strong culture of invention and risk-taking, and a relentless focus on customer relationships.

HCL offers an integrated portfolio of products, solutions, services, and IP through our Mode 1-2-3 strategy, built around digital, IoT, cloud, automation, cybersecurity, analytics, infrastructure management, and engineering services, among others.



Under Mode 1, HCL delivers core services in the areas of IT applications, infrastructure, BPO, engineering, and R&D; leveraging DRYiCE autonomics and orchestration to transform clients' business and IT landscape making them lean and agile.

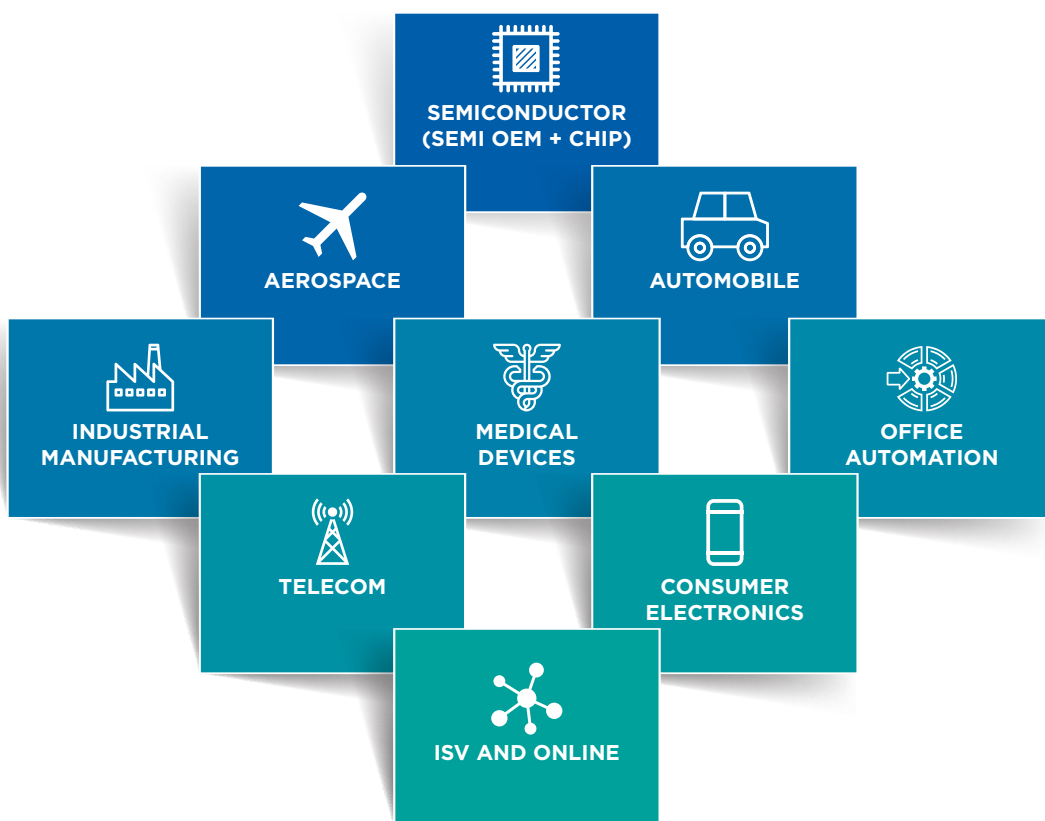
Under Mode 2, HCL delivers experience-centric and outcome-oriented integrated offerings of digital & analytics, IoT WoRKS™, cloud native services, cyber security and GRC services.

Mode 3 includes the external IP partnership with IBM, now extending to half a dozen products. HCL also continues to invest in our internal IP creation strategy and expansion of capabilities and markets for DRYiCE – the next-generation autonomics, and orchestration solution.

ENGINEERING EXPERTISE

Mechanical engineering services and R&D are in the DNA of HCL. The manufacturing experience of computer systems and servers has helped HCL to form HCL Technologies Ltd. of which Engineering and R&D Services (ERS) BU is one of the important building blocks. HCL's mechanical Engineering and R&D Services (ERS) offers end-to-end services with flexible engagement models. It is the preferred engineering transformation partner for global enterprises, which includes 61 of the top 100 R&D companies. HCL ERS credentials include 40+ years of complex engineering experience, over 27,500 ideapreneurs, close to \$2bn annual revenue run rate, and 1500+ patents. ERS is one of the four business units of HCL Technologies contributing around 24% of HCL revenues, the others being, IT apps, infrastructure, and BPO.

INDUSTRY VERTICALS SERVICED SPAN ACROSS



SEMI OEM CREDENTIALS & STRENGTH



6

Successful Partnerships
With Top 10 OEMs



70%

Market Share
Highest among Indian
ISO Players



4

10+ Years of Engagement
Strategic long-term
partnerships



1500+

Engineers
Largest integrated engineering
team focused on Semi in the
industry



20

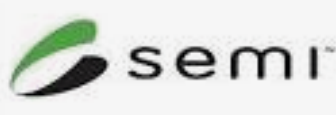
Years of Experience
14,000+ person years of
engineering experience
with Semi OEMs



\$5M+

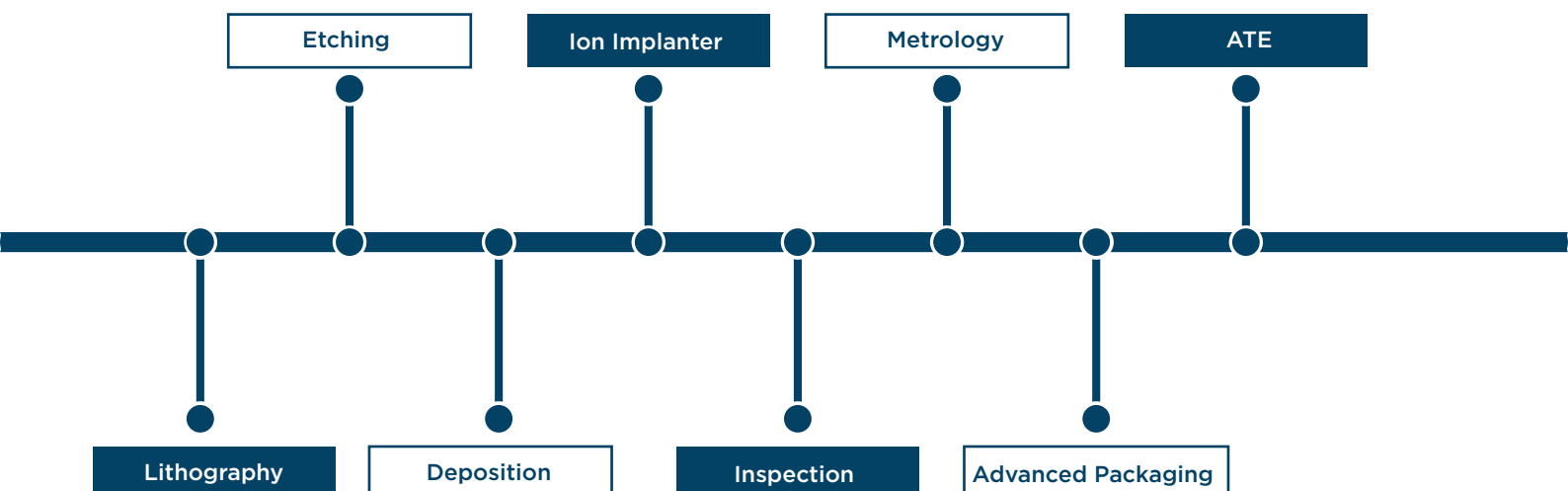
Investments
Highest Investments -
5 Customer Labs, 10k Clean
Room, Solution Frameworks

COMPLYING WITH INTERNATIONAL STANDARDS



SEMI STANDARDS

S1, S2, S8, S22, F47, E4, E5, E30, E37, E40,
E84, E87, E94, E116, E120, E125, E132, E124



SEMI EQUIPMENT OFFERINGS

-  **Mechanical Engineering Services**
NPI & Sustenance Engineering, Subsystem Design & Detailing, Engineering Change Management, Obsolescence Management, Equipment Cost Reduction, Industrial Design, Technical Publication, PD Box Design, Cable & Harness Design, Prototype Development
-  **Silicon and System Development Services**
PCB Design & PCBA Re-Engineering, VLSI, FPGA Design, Component Engineering, Power Electronics, Test & Validation, Legacy Software Re-Engineering, Test Fixture Engineering and Niche Services - Signal & Power Integrity Analysis, Imaging and Motor Control
-  **Software Services**
Software Development & Validation, Sustenance Engineering, Migration Services, DevOps, Recipe Management
-  **Product Testing Services**
Product Testing and Qualification, Handler Labs, Test Automation, Domain Centric Testing, Life-Cycle Testing, Testing Optimization Services using SLUs Factory Automation Stack Testing
-  **Life Cycle Support**
System Services, Prototyping, and Low Volume Manufacturing, PDM/PLM, Field Support
-  **Enterprise Services**
Cloud, Mobility, PLM, Factory Automation, MES, Industry 4.0
-  **Next-Gen Services**
Analytics, Cybersecurity, IoT, Softwarization

CENTERS OF EXCELLENCE



SUB-SYSTEMS EXPERIENCE

Subsystems List with Expertise	Mechanical Engineering	Electrical & Electronics Engineering	Software Engineering	Compliance & Certification	Prototyping (3-5 Units)	Low Volume Manufacturing
Gas Delivery System	✓	✓	✓	✓		
Cooling System Design	✓	✓	✓	✓	✓	
Power Distribution Box	✓	✓		✓	✓	✓
3D Cable Harness	✓					
Control System (PLC)	✓	✓	✓			
Interlocks	✓	✓	✓	✓	✓	
Facilities/Utilities	✓	✓	✓	✓		
Frames and Structures (Electronics Racks etc)	✓					
Doors/Enclosures	✓	✓	✓			
Exhaust/Ventilation	✓	✓				
Smoke Detection System	✓	✓				
Mechanism Design	✓	✓	✓		✓	
Electro-mechanical Components Packaging	✓	✓		✓	✓	
Wafer Transfer Module/Load Lock	✓	✓	✓	✓		
Wafer Handling Assemblies	✓	✓	✓		✓	
Vacuum Plumbing (Pump/Exhaust etc)	✓					
Vacuum Chamber	✓					
Heater Assembly/Pre-heat Station	✓	✓				
High Voltage Engineering	✓	✓				
Magnet Assemblies	✓					
Ion Source Assembly Components	✓					
Shower Head	✓					
Magnetron Assembly	✓					
Electron Flood Assembly	✓					
Reactor Assembly	✓					
Spindle Assembly	✓					
Faraday Assembly						
Stage & PMAC		✓	✓			
Light Source Assembly	✓	✓	✓			
Automation	✓	✓	✓		✓	
Opto-mechanical Assembly	✓	✓	✓			
Opto-mechanical Assembly Tooling	✓					
Metal Contamination reduction	✓					
Particle Reduction	✓					
Wafer Chuck	✓					
EFEM	✓	✓	✓			
Load Port	✓	✓	✓	✓		
Instrumented Wafer	✓	✓	✓	✓	✓	
ATE - Digital (High Speed Digital) Instrument	✓	✓	✓			
ATE - Analog / RF Instrument	✓	✓	✓			
Post Silicon Validation		✓	✓			
GUI & Utilities / Tools			✓			
Handler			✓			
Yield Management Software			✓			
Machine Control System SW			✓			
Shipping Packing Design	✓		✓		✓	
Semi Standard compliance	✓	✓	✓		✓	
Test Fixture / DIB / Probe card	✓	✓	✓		✓	

SEMI OEM PROPOSITIONS



EXPERIENCES ENGINEERED FOR OUR CUSTOMERS

- Reduction of cost by 20%, accumulating to \$ 60 million in ten years. Accelerating migration to new platforms, and reduction of time to market for leading ATE.
- Customer-specific labs and clean rooms for autonomy of projects. Established a collaborative engagement model with a customer's captive center in India resulting in cost savings of \$ 150 million in 12 years.
- Helped a leading ion implantation customer to improve their market share by delivering a time critical NPD program. This involved total ownership in the design and development of a complete ion implantation equipment based on the product requirement document. HCL delivered the proto tool first-time-right with 20% improvement on time-to-market, and met the product cost targets, and program budget constraints.
- Resolved customer's hardware obsolescence problem by re-engineering a critical legacy ASIC-based line card to a FPGA-based one, thereby addressing critical tool down time, extending product lifespan, and offering cumulative savings of \$1 million over five years.
- Addressed customer's production line ATE obsolescence risk by re-engineering a solitary legacy production test fixture by gathering detailed requirement from existing legacy system. HCL also recreated a functionally equivalent system employing best design and qualification practices. This development was invaluable for the customer as a potential \$ 2 million business risk due to production down time was addressed.
- For a wafer inspection and metrology OEM, HCL developed a test automation framework resulting in 40% automation of manual regression with improved test coverage to 90%, along with test time reduction from two months to two weeks, with a savings of \$ 300K annually.
- For a MOCVD OEM, HCL reduced the software development time-to-market with use of standard framework, resulting in 70% code reusability, and reduced development costs by 30%.

HCL



www.hcltech.com

HCL Technologies (HCL) empowers global enterprises with technology for the next decade today. HCL's Mode 1-2-3 strategy, through its deep-domain industry expertise, customer-centricity and entrepreneurial culture of ideapreneurship™ enables businesses to transform into next-gen enterprises.

HCL offers its services and products through three lines of business - IT and Business Services (ITBS), Engineering and R&D Services (ERS), and Products & Platforms (P&P). ITBS enables global enterprises to transform their businesses through offerings in areas of Applications, Infrastructure, Digital Process Operations, and next generation digital transformation solutions. ERS offers engineering services and solutions in all aspects of product development and platform engineering while under P&P. HCL provides modernized software products to global clients for their technology and industry specific requirements. Through its cutting-edge co-innovation labs, global delivery capabilities, and broad global network, HCL delivers holistic services in various industry verticals, categorized under Financial Services, Manufacturing, Technology & Services, Telecom & Media, Retail & CPG, Life Sciences, and Healthcare and Public Services.

As a leading global technology company, HCL takes pride in its diversity, social responsibility, sustainability, and education initiatives. As of 12 months ending on March 31, 2020, HCL has a consolidated revenue of US\$ 10 billion and its 159,000 ideapreneurs operate out of 50 countries.

For more details contact: ers.info@hcl.com

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