

21ST CENTURY AEROSPACE ENGINEERING



**HCL ERS AEROSPACE AND DEFENSE ENGINEERING
SERVICES**

**21ST
CENTURY
TECHNOLOGIES**

HCL IN AERONAUTICAL INDUSTRY

Worked with
8 of the top 10 A&D
companies

Multiple projects
executed in commercial &
defense, from multiple
locations including **ITAR**
compliant centers in the US.
50+ SOI Audits
performed.

Presence of **12**
dedicated design
centers

\$25Mn investment into
generic as well as
functional labs

In-house labs offering low
volume manufacturing and
prototyping capabilities.
Dedicated teardown lab for
competitive benchmarking

Rated
#1 in Aerospace and
Defense by Zinnov

THE AERONAUTICAL INDUSTRY **TODAY**

Despite an upsurge in demand for air travel, airlines are having trouble maintaining profitability. They must provide passengers with the right experience at the right price point while ensuring higher utilization of capital-intensive equipment.

Technology is playing an increasingly crucial role in addressing these objectives. Having pioneered offshore engineering services in this industry more than a decade ago, we have become the largest dedicated aerospace practice in India and the preferred engineering partner for new aircraft programs across the A&D ecosystem, offering application management services, infrastructure support, testing, and new-product development. In the past decade, we've successfully executed projects in various subdomains and have partnered on all major commercial aerospace programs.

SYSTEM AND SUBSYSTEM EXPOSURE





Embedded Sw Engineering

- Complete life cycle support for safety critical on-board software including participation in Sol audits
- In house Aerospace specific Quality Framework - AQMS, RTCA DO 178 and MIL standards
- CMMi L5, AS 9100C certified



Electronics

- ASIC /FPGA /SoC Design, Board design, Verification and Design Analysis. Obsolescence Management (FPGA, PLAs, DSPs and DO 254 Stds.etc)
- Complex FPGA with 3 million gates, PCB Designs up to 26 Layers, 800MHz Bus Speeds
- Alliances with vendors for EDA, IP/DESIGN / FPGA / FOUNDARIES



Mechanical Engineering

- Concept to Manufacturing services across Aerostructures, Aero Engines and Aero Systems
- In house Design Frameworks and Tools- OPTICOM, SEAD, RED, Value Engineering
- Centre of Excellence in Industrial Design, CAE & Reliability Analysis
- Aircraft Interiors
- Manufacturing Engineering Services
- Aftermarket Services



Test Engineering And Ate Solutions

- Largest Aerospace V&V practice in India
- End to End Test Engineering Solutions

For a leading aerospace OEM, HCL developed software that certifies products worth more than \$30B annually. 38% of onboard software on their latest major aircraft has HCL's footprint. The multifaceted partnership also resulted in HCL being a preferred partner for R&D and offset related work. We also developed a major risk sharing agreement with them.

For a US based avionics major, HCL invested over \$100,000 to design, develop and manufacture a working prototype within 16 weeks from scratch. 10 new features were introduced in the process to revive product sales.

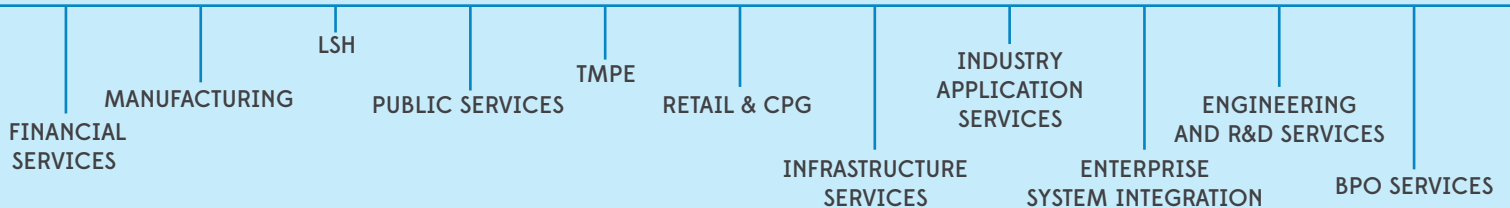
For an aerospace major, HCL designed the inerting systems pallet to carry three ASM cylinders and achieved a weight that was 12% below the predefined target leading to substantial cost reduction.

For an aerospace major's advance flight control system, HCL performed requirement-based testing of the enhanced digital flight control system functions to satisfy DO - 178B level A,B and C requirements. Board redesign was done for a slat/flat control unit to address reliability issues and to replace components that went obsolete.

▲
**EXPERIENCES
WE ENGINEER
FOR OUR CUSTOMERS**

HCL - A \$7 BILLION GLOBAL ENTERPRISE

HCL Technologies brings IT and engineering services expertise under one roof to solve complex business problems for its clients. Leveraging our extensive global offshore infrastructure, network of offices in 31 countries and 110,000 employee base, provide holistic, multi-service delivery in industries such as financial services, manufacturing, consumer services, public services and healthcare. HCL's 38 year journey has been truly transformational.



\$1 BILLION IN NET PROFIT

\$5 BILLION IN REVENUE

\$15 BILLION IN MARKET CAPITALIZATION

**WE ARE AMONGST THE ONLY EIGHT
21st CENTURY COMPANIES TO ACHIEVE ▲**

HCL ENGINEERING AND R&DSERVICES IS BUILDING 21ST CENTURY TECHNOLOGIES

Organizations today are experiencing an unprecedented phenomenon. In the previous century, a company would remain listed as a Fortune 500 company for about 60 years. Today, they stay in that list for less than 18 years! Corporate profits are shifting to asset-light idea-intensive sectors. Emerging-market giants are gaining global scale; with the share of US and Western European companies in the Fortune 500 falling. Asset light technologies are creating more incremental value creating the need to pivot to service R&D. Firms with large legacy product R&D organizations will have to transition in a non-disruptive way. Kick starting Service R&D organization will need extensive collaboration. Thus, engineering spend is going to change drastically in the coming decade.

HCL with its engineering heritage, global presence, cumulative revenue impact and being the largest and fastest growing engineering services provider from India is ideally placed to transform your enterprise.

CUSTOMER CENTRIC
Design Centric, Accessible,
Innovative

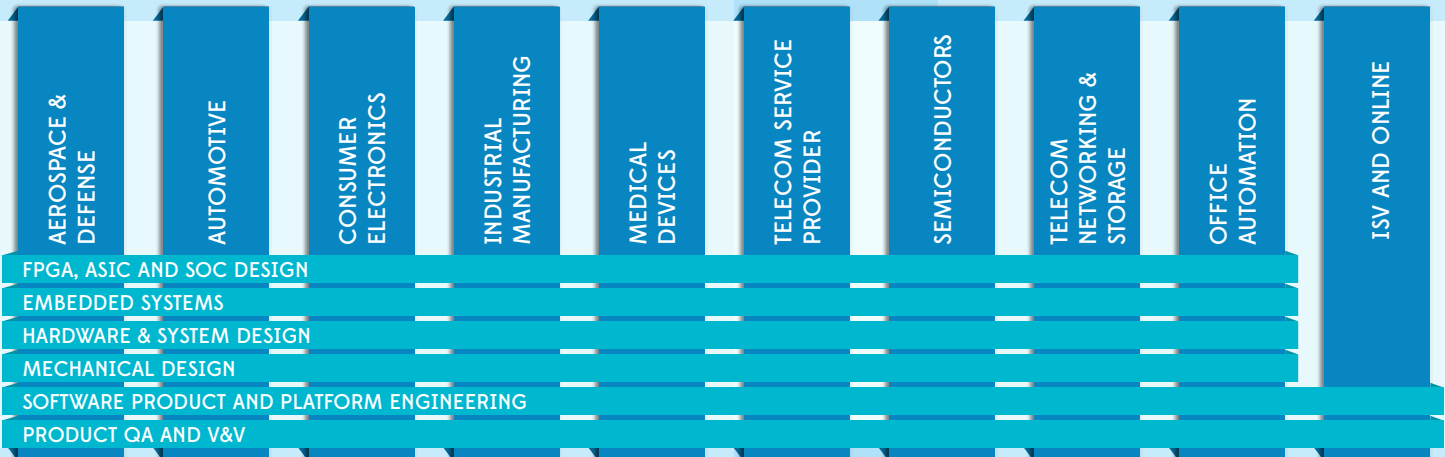


AGILE
Platformized, Continuously Released,
Data Driven

The face of 21st century technologies will be **Customer Centric** - in terms of design centrality for industrial and UX design, accessibility & innovation as a service ; **Agile** - in terms of e-business platforms, DevOps framework and engineering analytics; **And Efficient** - in terms of Support & test automation, Value engineering and intelligent sustenance.

EFFICIENT
Automated, Frugal,
Sustained

HCL ERS has been instrumental in engineering multiple products for 300+ customers across 10 industry verticals. Our engineering services straddle the entire product development lifecycle from new product introduction to end of lifecycle.



~\$ 50 Billion product revenue enabled over last ten years for our customers

Industry leading recognition by Gartner, Forrester, IDC, TBR and Frost & Sullivan

1250+ patents filed, \$20M invested in own labs, 35+ customer labs

Work with 55 of the top 100 R&D spenders globally

#1 ESO provider from India, fastest growing, 600+ basis point market share gain in 4 years

*Relationship*TM
BEYOND THE CONTRACT

Gartner

Endo selected HCL as one of its partners not only for its technical depth and expertise, but more importantly because it was able to secure HCL's commitment to a long term R&D partnership.



The HCL-Rockwell Collins relationship is a model case study in technology services outsourcing best practices.



Meggitt sees HCL's role not only in executing to statements of work but also in contributing and adding value such as suggesting ideas for design improvements.



FROST & SULLIVAN

We have used HCL all the way from testing, specification engineering, software engineering and areas in media as well.



FROST & SULLIVAN

We have given HCL not only development responsibilities, but product management responsibilities and technical engineering responsibilities.



Hello, I'm from HCL's Engineering and R&D Services. We enable technology led organizations to go to market with innovative products and solutions. We partner with our customers in building world class products and creating associated solution delivery ecosystems to help bring market leadership. We develop engineering products, solutions and platforms across Aerospace and Defense, Automotive, Consumer Electronics, Software, Online, Industrial Manufacturing, Medical Devices, Networking & Telecom, Office Automation, Semiconductor and Servers & Storage for our customers.

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