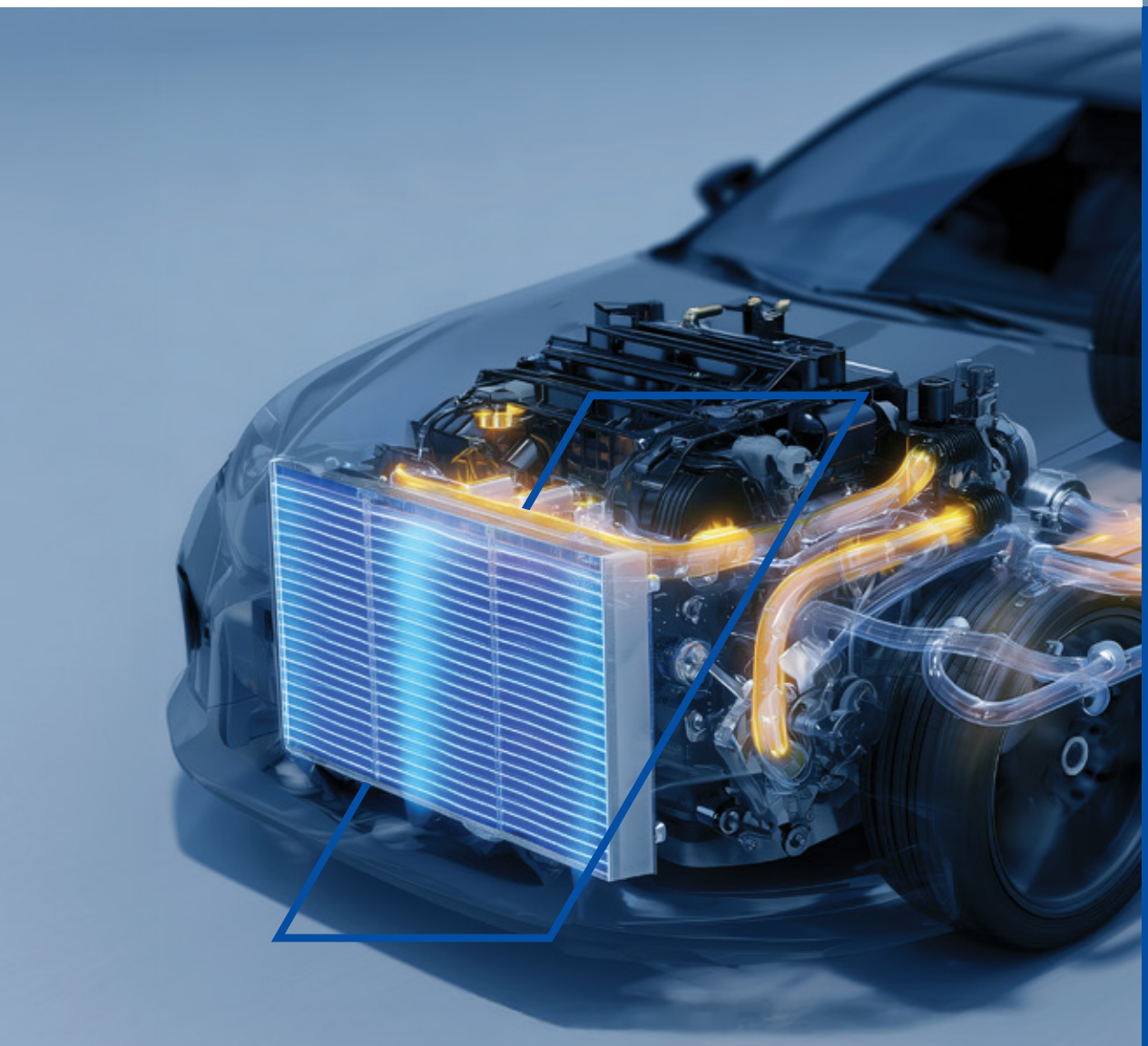
L&T Technology Services

Design Intelligence for Vehicle Systems

Turning complex design knowledge into faster engineering decisions

CASE STUDY



engineering intelligence



EXECUTIVE SUMMARY

A leading European Tier-1 supplier faced growing delays as engineers spent weeks navigating fragmented design knowledge spread across drawings, calculations, and engineering documents.

LTTS engineered a Design Intelligence platform that transformed disconnected engineering repositories into a traceable knowledge foundation, enabling faster design understanding and engineering decision-making.

CLIENT CHALLENGE

Modern vehicle development generates enormous volumes of engineering knowledge. Design decisions, calculations, validation criteria, process flows, drawings, and lessons learned accumulate over years, often spread across dozens of independent repositories.

For this Tier 1, understanding a subsystem such as a radiator tank often required engineers to manually navigate through multiple engineering documents spanning PDFs, spreadsheets, calculations, drawings, and process artifacts. Building sufficient context to begin meaningful design work could take weeks.

The challenge wasn't access to information—it was converting information into usable engineering knowledge. The Tier 1 needed a way to help engineers discover relevant insights faster, retain critical design context, and shorten the learning curve across the product development lifecycle.

ENGINEERING COMPLEXITY



Knowledge was distributed across multiple engineering formats. Critical information existed inside calculations, drawings, diagrams, flowcharts, tables, and process documentation-not just searchable text.



Engineering relationships matter more than individual documents. Understanding why a design choice was made often required connecting information across multiple sources, calculations, and design stages.



Manual validation created a development bottleneck. Engineers spent considerable effort locating, reviewing, and consolidating design information, often revisiting source data multiple times to verify requirements and measurements, resulting in longer validation cycles and delayed design decisions.



Trust could not be compromised. Engineering teams needed every answer to be traceable back to original documents, calculations, and design records.

OUR SOLUTION

LTTS engineered an AI-powered Design Intelligence platform that transformed fragmented engineering repositories into a traceable and interactive knowledge layer, helping engineers move from document discovery to design understanding faster. By combining structured engineering knowledge, multimodal AI, and source-aware intelligence, the solution enabled rapid access to critical design information while preserving engineering context and traceability.

01 **Unified Engineering Knowledge Repository** — Consolidated information spread across multiple engineering documents (PDF, XLS, Drawings etc.), calculation sheets, drawings, process flows, and technical artifacts into a single searchable environment, eliminating the need to manually traverse disconnected repositories.

02 **Multimodal Design Intelligence** — Enabled engineers to interact with drawings, diagrams, images, tables, flowcharts, and formula calculations alongside textual explanations, improving the interpretation of complex engineering knowledge.

03 **Context-Aware Knowledge Retrieval** — Developed an intelligence layer capable of connecting information across multiple documents and engineering sources, helping engineers understand design rationale rather than retrieving isolated information.

04 **Engineering Reasoning & Design Guidance** — Analyzed calculations, performance criteria, standards, and test data to provide contextual guidance on design approaches, component selection, and validation requirements, enabling faster engineering decisions.

05 **Source Traceability & Validation** — Embedded source locator functionality, document references, and page-level citations within responses, allowing engineers to validate outputs against original engineering records with confidence.

06 **Guided Engineering Discovery** — Implemented smart prompting capabilities that identify missing context, recommend follow-up queries, and guide engineers toward more complete design insights when requirements are not fully defined.

07 **Scalable Engineering Intelligence Framework** — Built reusable AI components and knowledge models that can be extended beyond radiator systems to other vehicle domains such as seating, lighting, and future subsystem development programs.

BUSINESS OUTCOME

Up to 50% productivity improvement

by reducing the effort required to search, review, and interpret engineering documents, calculations, and design artifacts.

Accelerated design understanding

through faster access to design knowledge, calculations, drawings, and process context that previously required extensive manual review across multiple sources.

Greater confidence in engineering decisions

with source-backed responses that provide document references, source locations, and page-level traceability.

A scalable AI foundation for future programs

with reusable components that can be extended beyond radiator systems to additional vehicle engineering domains.



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ENGINEERING THE CHANGE

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