



Vehicle Engineering in Bombardier Transportation

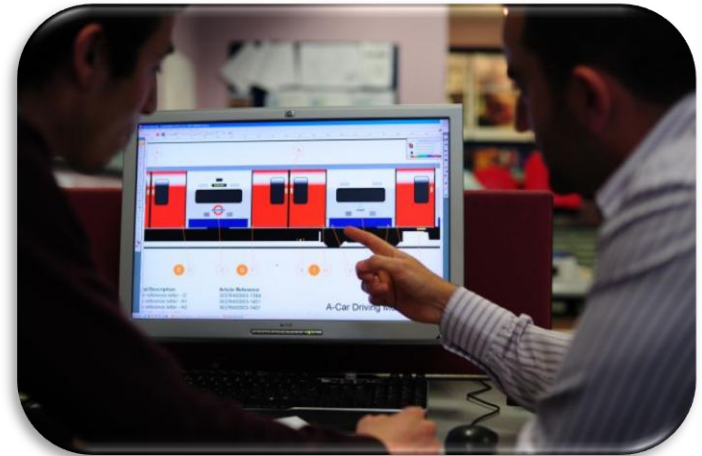
BOMBARDIER
the evolution of mobility

Chief Engineer

Role and responsibilities

- In the bid phase - elaborate and develop product solutions which represent the best proposal for the business:
 - Competitive advantage, compliance
 - Cost, LCC
 - Re-use, low risk, low engineering effort

- In project - develop the product concept and solution for overall engineering
 - Technical authority
 - Requirements management, Train specification, Concept and Solutions
 - Interfaces management
 - Functional Engineering
 - Performance management
 - Risks management



Vehicle Engineer

Role and responsibilities

- Support the Chief Engineer in all areas requiring a vehicle perspective (Interface with infrastructure, operator, maintenance, drivers, users; Concept, Design for Manufacturing, Space allocation; Overall architecture; Industrial Design; Risk Management; Interfaces; Trade-offs and arbitration; Suppliers selection)
- Responsible for the physical concept of the vehicle based on targeted performance (customer requirements, cost, reliability).
- The Vehicle Engineer has to balance many issues which impact the performance and cost effectiveness of the product
- The Vehicle Architect will typically be system engineer with many years experience with various systems fitted to the interior and exterior of the vehicle. The experience can be mechanical or electrical but will be supported by performance engineering training.



Functional Architect

Role and Responsibility

- Support the Chief Engineer in Functional Engineering and Architecture (Functional requirements collection and analysis; Safety analysis and integrity analysis; Functional architecture (TCMS, TCN, Sub-systems) and Specification, Change management; Validation plan; Functional modelling and simulation)
- Responsible for the architectural design of the train to fulfil the functional requirements of the client. Typically this includes the concept designs for the driving, auxiliary, monitoring and communication controls of the train necessary to meet the safety and reliability objectives for all defined operational conditions.
- The Architect will need to specify which systems provide functional contributions to meet the key functional requirements.
- To be effective in this role the Architect will need to have a very good and broad understanding of control circuit design, networks and supporting software design and equipment solutions. A knowledge of all systems that contribute to the Train Control and Monitoring solution will be needed.
- Most importantly the Architect will have a full understanding as to the operating requirements of the train and their respective level of Safety / Availability.



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Performance Architect (1/2)

Role and responsibilities:

- Support the Chief Engineer in Performance Management and Architecture
 - Performances assessment and development of Performance Plans
 - Trade-off management
 - Risk assessment and management
 - Targets distribution and challenge

- Responsible for leading the entire Vehicle Performance scope on a bid or project
- Day to day management of Specialists (Vehicle Performance Engineers) who are allocated 100% to the project, Interfacing to Specialists who are not 100% on the project
- Planning work, monitoring progress against deliverables and spend and reporting.
- Ensuring vehicle level performance requirements are captured and allocated to relevant systems and sub-systems, and managing these through the V-cycle to a final validated set of design solutions
- Identification and pro-active management of 'risk' areas within the scope

Performance Architect (2/2)

- Responsible for the overall achievement of vehicle non functional performance e.g. Energy Consumption, Vehicle Dynamics and Comfort, Materials, Fire Safety, Design for Environment, Structures, Crash, Gauge, Mass, Acoustics, Aerodynamics, Thermodynamics, EMC). The challenge for the architect is to balance and optimise the design solutions for all the performance requirements
- The Performance Architect will typically be an expert in one of the performance disciplines but have a good understanding of many of the other disciplines. Knowledge of the typical performance engineering processes and tools will be required to ensure the concurrent processes and key decision milestones are understood and aligned.



Our products

Please see below a few examples of the products developed by our vehicle engineering teams - please click on the text below the images view our product-related videos



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Our main sites

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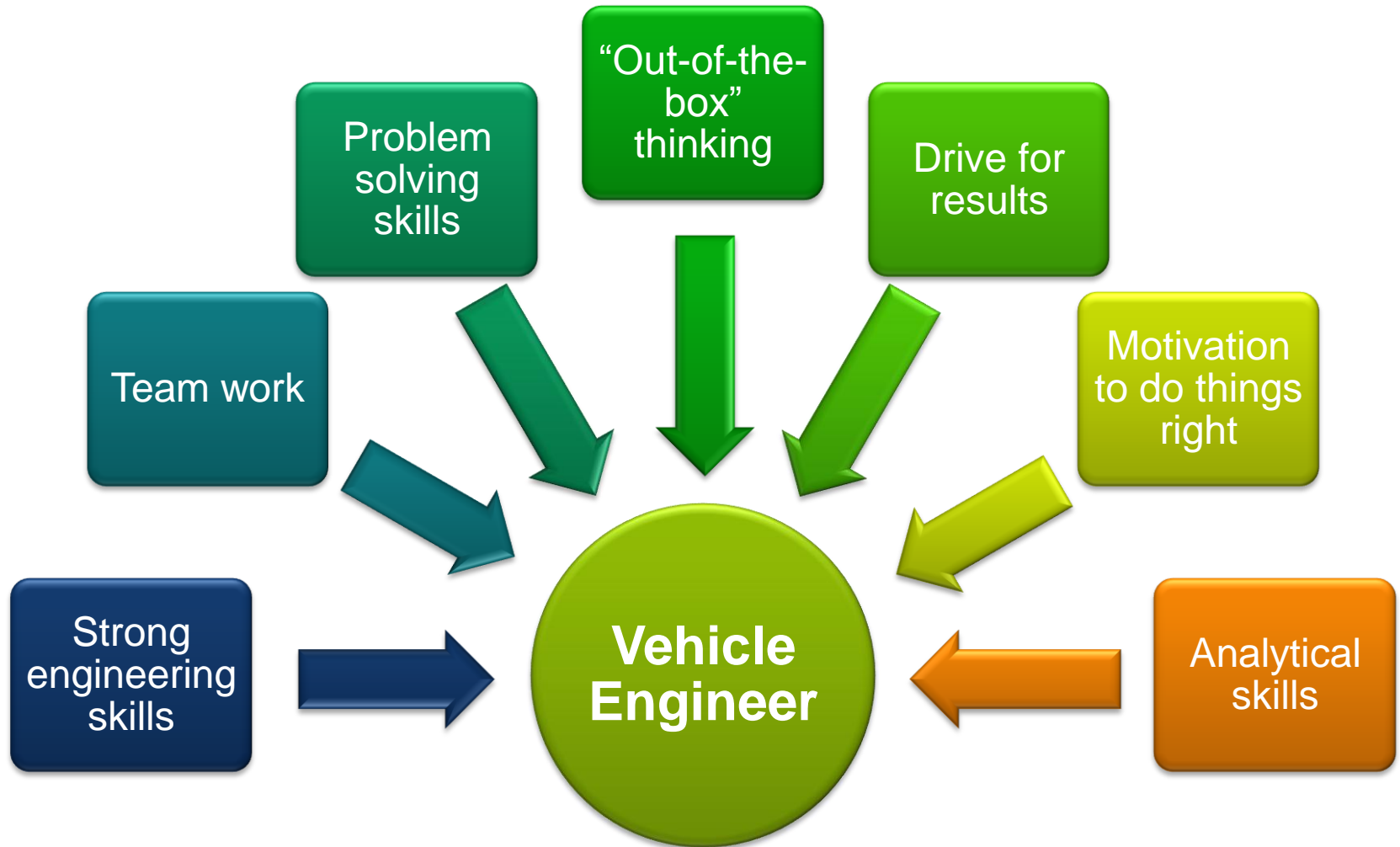
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