

# Simulation strategy

**PHRONESIM** help organisations achieve their business goals with engineering simulation; assessing the current state, quantifying gaps, identifying improvement options and implementing simulation strategy

Andy Richardson



**A**ndy Richardson CEng FIMechE is Founder and Director at PHRONESIM Ltd.

Responsible for providing consulting services in engineering simulation strategy development and implementation.

**Steve Welch:** Could you tell me a little about your background in the sector?

**Andy Richardson:** I spent over 30 years in the automotive sector at JLR, with 20 years in Senior Engineering Management roles, including 10 years as Head of Simulation. During this time I was responsible for creating and implementing JLR's Engineering Simulation Strategy across engineering.

I also spent 2 years in the Aerospace sector as Deputy Head of Airframe Methods and tools at Airbus Commercial aircraft.

In 2021 I decided to set up my own company, 'PHRONESIM Ltd', to enable me to share my knowledge and experience with other organisations seeking to achieve the full potential of their engineering simulation capabilities.

**SW:** Could you provide a brief summary of your organisation and offering to the market?

**AR:** PHRONESIM is a small company that provide independent advice on engineering simulation strategy. We help organisations achieve their business goals with engineering simulation; assessing the current state, quantifying gaps, identifying improvement options, coaching the team, building and implementing simulation strategy.

Services provided by PHRONESIM include; maturity assessment, strategy creation, improvement opportunities identification, building a business case, building roadmaps, and strategy implementation. PHRONESIM also provide training and coaching in engineering simulation strategy.

**SW:** Who in the main are the companies you engage with and in what way?

**AR:** PHRONESIM work across industry sectors worldwide, from smaller organisations through to blue chip multinationals.

**SW:** Do you have a project or case

study you could provide some details of?

**AR:** We have recently had the opportunity and privilege to deliver maturity assessments to a couple of multi-national companies. The first project was with an international large consumer goods company. The second project was a luxury vehicle manufacturer.

In both cases, we worked closely with the simulation leaders and stakeholders to apply the maturity assessment framework.

We were able to complete a comprehensive assessment of their simulation capability, and identify a range of targeted improvement opportunities to enable them to improve the effectiveness and efficiency of their engineering simulation.

**SW:** What are your reflections on 2023?

**AR:** 2023 was the year everyone was talking about artificial intelligence (AI).

AI, machine learning (ML), and data analytics (DA), have the potential to be very powerful tools for engineers

ESSENTIAL ELEMENT	DESCRIPTION
PROCESS	Efficient processes that define the simulation workflows and aligned to the overall development processes.
METHODS	Capable and effective methods to define how to model the specific physics required to deliver the product requirements.
TOOLS	Capable and connected tools to model the correct physics accurately.
MODELS	Representative and accurate models that reflect the latest design intent.
DATA	Available and accessible technical data to define material properties, technical specifications, modeling parameters, and use cases.
PEOPLE & ORGANISATION	Skilled and experienced people with product knowledge and experience of the tools and methods, organised effectively to maximize collaboration and efficiency.
COMPUTE INFRASTRUCTURE	Sufficient, reliable and flexible computing infrastructure and resources to execute the complex and large scale simulations.



in the right circumstances, and if applied correctly. Organisations recognise the potential value, but are often uncertain how to apply the technology in the context of product engineering and specifically engineering simulation. AI/ML should be regarded as a powerful complement to engineering simulation especially for identifying trends and relationships between technical datasets, whether sourced from simulation, test, or other sources. Keeping a focus on the fundamentals is crucial, for example, understanding the applicability and pedigree of the source input data.

**SW:** What do you see as the key trends in the sector?

**AR:** Accelerating new product technology introduction, and increasing product complexity, will continue to reinforce the importance of simulation for product engineering organisations.

Increasingly sophisticated simulation techniques will be needed, such as; systems modelling, Multiphysics analysis, multi-discipline optimisation, sensitivity and robustness analysis, and uncertainty modelling.

At the same time engineers will want to use Data Analytics, techniques to create surrogate models to be able to explore concepts and design alternatives more rapidly.

Some organisations will continue to push towards using simulation to

sign-off designs without test. This will drive organisations to higher levels of quantifiable confidence in their methods. It will also put a spotlight on organisations being able to demonstrate that their processes, methods, tools, models, data, people, and compute infrastructure can be shown to be; appropriately accurate, verified, robust, reliable and repeatable. Organisations need to understand their maturity against these critical elements.

Demand for increased and more flexible capacity in software, computing and data storage will continue with more organisations considering the use of cloud based hardware and software services to provide additional but flexible capacity whilst providing an optimum balance between capital and operating budgets.

**SW:** What are your objectives looking ahead through 2024 and beyond?

**AR:** I am really looking forward to helping more organisations assess their current position and build a strategy for their engineering simulation capabilities.



It will be great to run some more training courses to share how to build and implement simulation strategy.

I would also like to make some progress on the book on simulation strategy I have been promising to write.

**SW:** What are the main challenges facing the sector more generally and for you specifically?

**AR:** Keeping focussed on the fundamentals in an increasingly complex world is a real challenge. I always encourage teams, wherever possible, to break complex problems and projects into manageable chunks.

Data management is still a massive challenge for many organisations. Considerable time is often spent finding data, and then ensuring it is appropriate for the task and of verified quality. Robust data management is critical to the overall efficiency of the simulation processes and quality of the results.

In a world of complex tool landscapes tool to tool connectivity remains another source of inefficiency and quality risk. Unfortunately progress on standardised data exchange formats seems slow.

**SW:** How would you sum up your message to the market?

**AR:** Think about and share your vision, goals and requirements for simulation

- Identify your stakeholders and experts and form collaborative sharing communities
- Pay attention to ALL the essential elements; processes, methods, tools, models, data, people, and compute infrastructure
- Get an assessment of your current position
- Manage complexity. Keep it as simple as possible
- Make sure you have good control over the quality of your input
- Keep focussed on the fundamentals

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