

How Mature is your Simulation Capability?

How a Maturity Assessment can help maximise your Engineering Simulation Capability

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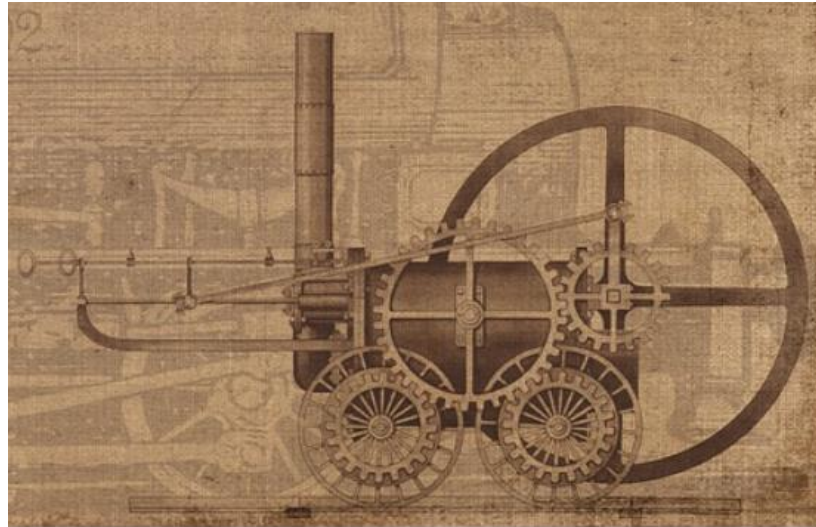
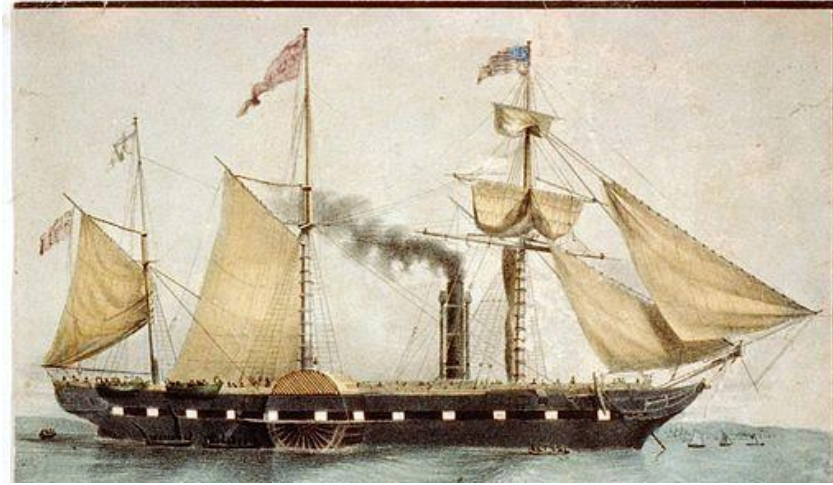
ON ANY JOURNEY YOU NEED TO KNOW ...



Know where you are, where you are going & how you are going to get there



WHAT DO YOU NEED FOR THE JOURNEY?

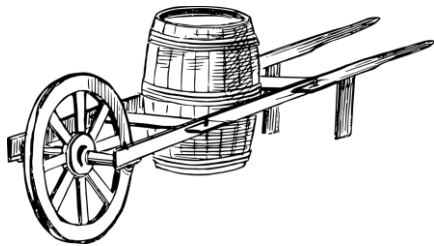
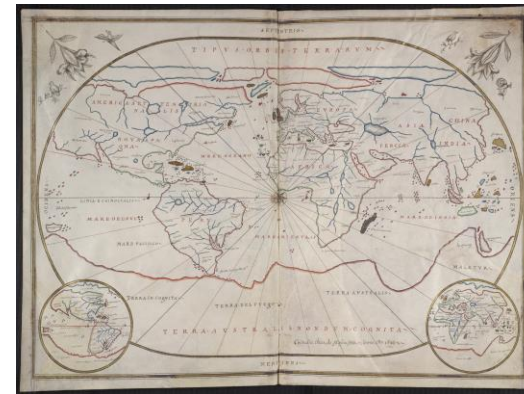
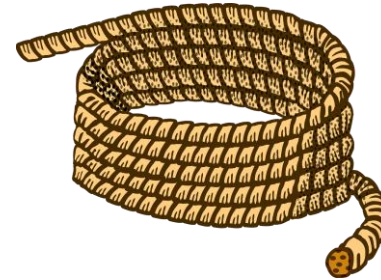


The different methods of transport have different capabilities and needs.

WHAT DO YOU NEED FOR THE JOURNEY? (Part 1)



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The Rules

- 1. Obey the rules*
- 2. There are no rules*



Destination – Position – Gap – Needs - Capability - Options – Progress – Noise Factors



- **And Don't Forget**



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Important to Keep the Team Happy!



But Maybe the Current State is not Good Enough



~~80~~
Days



40
Days



Faster - Easier - More Efficient - More Reliable - Cheaper

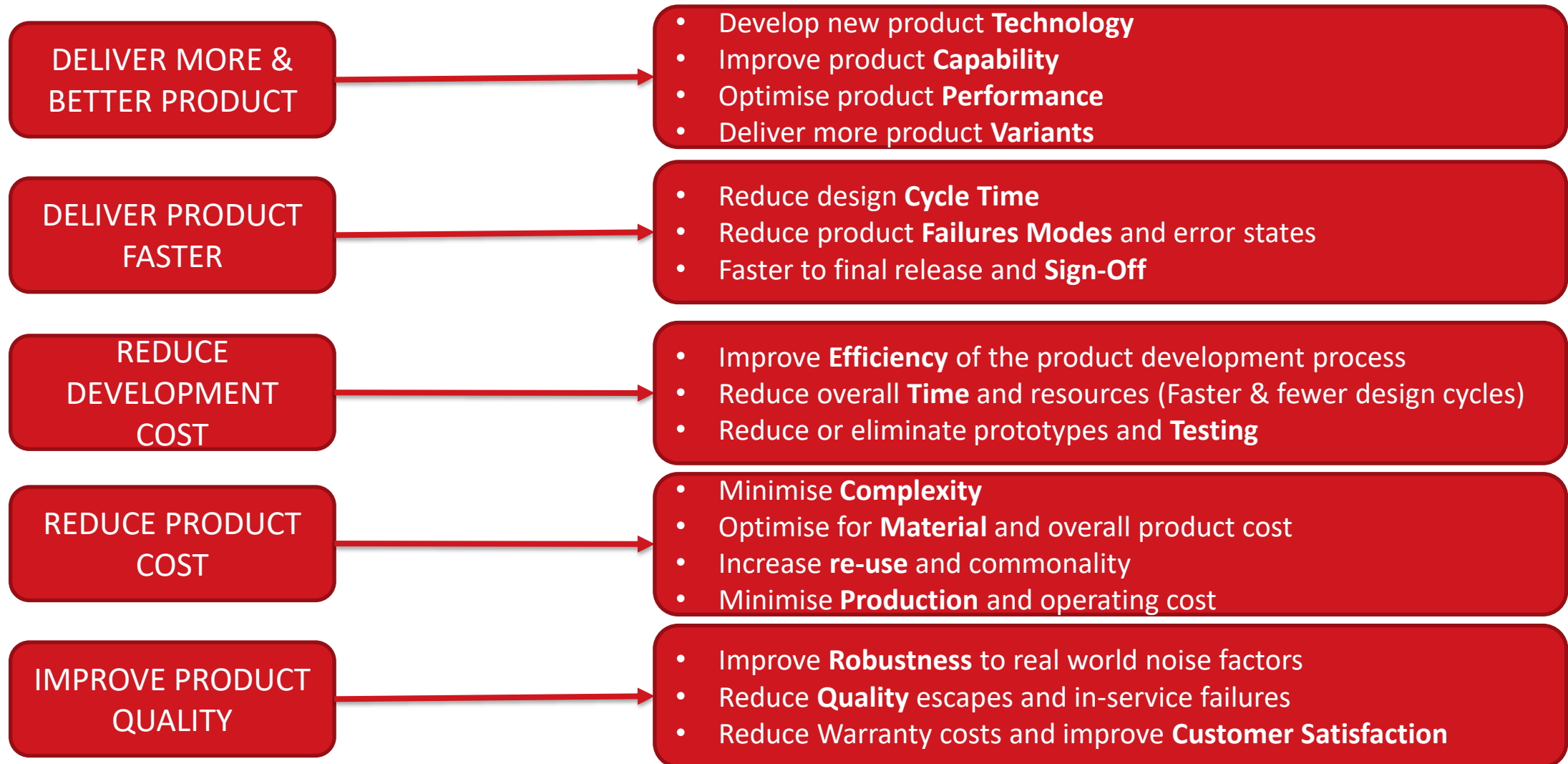
We need to build our capability. We need a strategy. We need a plan.



The Modelling and Simulation Journey



WHATS YOUR DESTINATION? *What's your Goal for M&S?*



Engineering Simulation is Critical to Deliver our Product and Business Goals



Modelling and Simulation NEEDS

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

Essential Elements Required for Capable, Effective and Efficient Simulation



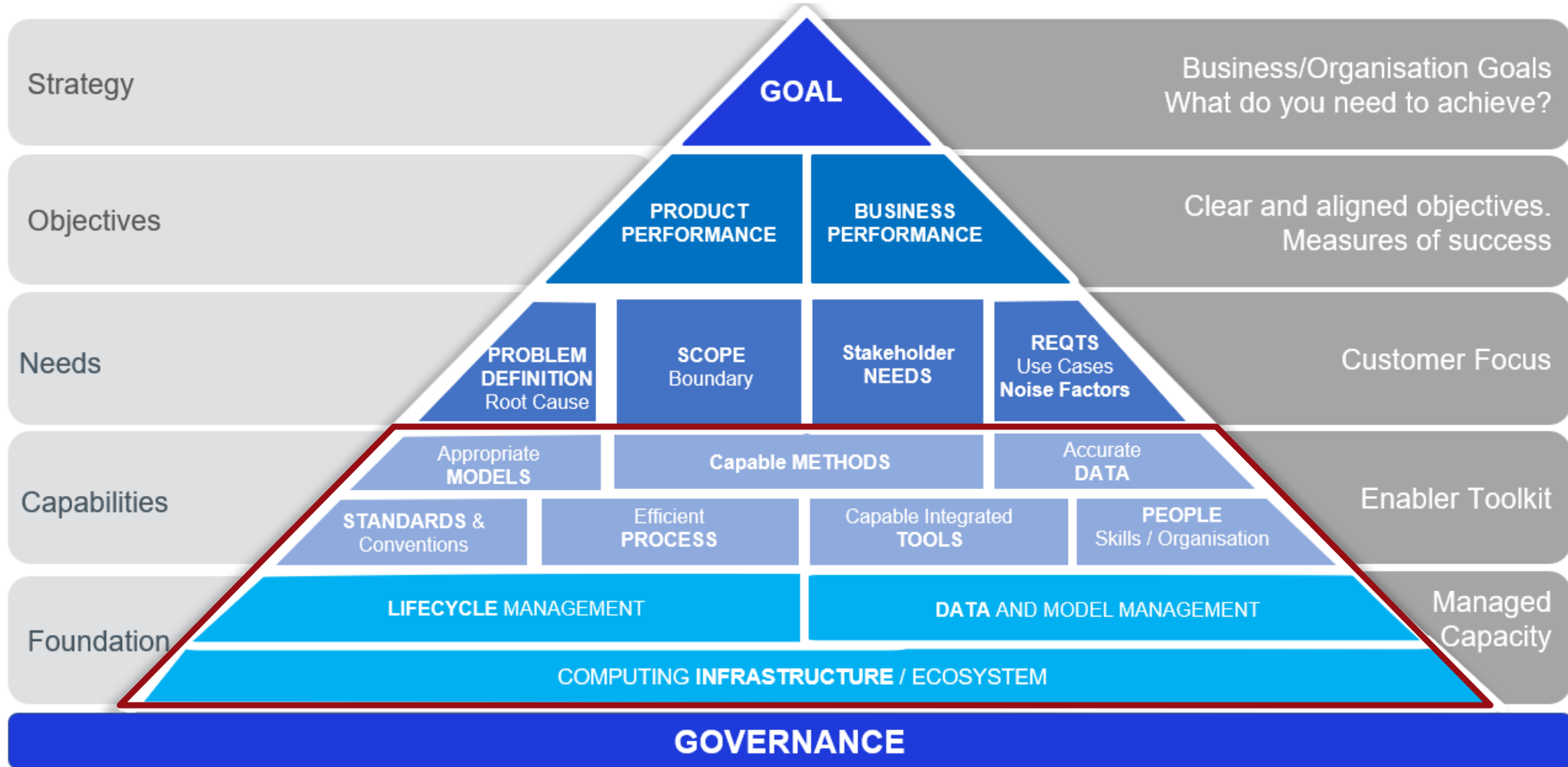
- **... and of course**



Important to Keep the Team Happy!



WHAT CAPABILITIES DO YOU NEED TO REACH YOUR DESTINATION?



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Essential elements to achieve an effective and efficient engineering simulation capability

WHAT CAN MAKE IT HARDER TO REACH YOUR M&S DESTINATION?



Product Technology

- New product technologies requiring new physics and multi-physics
- Increasingly demanding and complex requirements



Methods

- Organisation lacks confidence in results
- Method capability gaps
- Significant customization required



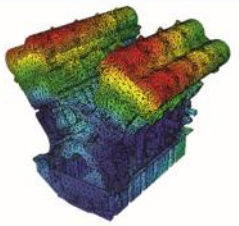
Process

- Process inefficiencies
- Complex process interdependencies
- Lot of manual input required.



Tools

- Need has changed. Wrong tools for the job.
- Complex tool landscape. Duplication across org.
- Locked-in to legacy tools. Tool obsolescence



Models

- Model quality. Input quality (CAD / Data)
- Design change.
- Limited sharing and re-use across organisation



People and Organisation

- Lack of collaboration and sharing across organisation. Lack of ownership in the M&S team.
- Lack of key skills. Changing requirements



Data

- Sourcing appropriate reliable data
- Overhead from manual data input.
- Multiple data formats across the organisation



Compute Infrastructure

- Need for increasingly large scale models
- Insufficient compute capacity
- Utilizing the latest technology (e.g. Cloud)

Typical challenges facing Simulation Leaders – Lack of Strategy



HOW CAN YOU MEASURE YOUR CURRENT POSITION

Maturity		Element	Strategy	Process	Methods	Tools	Models	Data	People and Organisation	Computing Infrastructure
		4	Systemic/Innovator Certification Level Governed (90-100%) Maintained Continuously Improved Futured	Target		Target	Target		Target	Target
3	Embedded High Confidence Fully Implemented (75-90%) KPI Monitored Actions Complete Goals Achieved		Target		Assessment	Target		Assessment	Assessment	
2	Comprehensive Medium Confidence Established/Aligned (50-75%) Fully Applied Improvement Plan In progress - On track			Assessment	Assessment	Assessment				
1	Needs Reviewed Low Confidence Partial Coverage (25-50%) Partially Applied Actions Identified Improvement Started	Assessment					Assessment			
0	Insufficient Poor Confidence Limited Coverage (<25%) Ad-hoc No Plan No KPI									

ORGANISATION SIMULATION CAPABILITY MATURITY (OSCM) Metric

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Using the OSCM Metric to Measure Status of Essential Capabilities and Quantify Gaps



POTENTIAL IMPROVEMENT ACTION PLANNING

Essential Element	Potential Improvement Actions	Goals
Process	Documented and Aligned to overall product process. Efficiency reviewed . Process Automation .	Efficiency. Speed. Robustness
Methods	Method Confidence Metric applied. Integrated Quality Controls.	Coverage & confidence up. Product performance. Reduced failures & testing.
Tools	Tool Strategy in place. Requirements and status audit.	Aligned to need. Reduce complexity & cost
Models	Model Strategy . Modelling standards and best practices. Modelling plan aligned to requirements	Quality. Planning. Effcy Sharing and re-use.
Data	Data Management Strategy (standards, verification) Data Maturity Metric adopted. Simulation Data Management [SDM] adopted.	Quality. Traceability. Access Useability. Effcy
People & Organisation	Skill Requirements analysis. Skills audit and development plan (Certification) Strategy Governance organisation in place.	Aligned reqts and skills Governed
Compute Infrastructure	Sufficient compute Capacity . Performance monitored. Demand forecasting and capacity planning. Latest technologies reviewed.	Sufficient. Flexible. Efficient. Mngd. Futured.
Strategy	Clear Goals for M&S . Comprehensive strategy. Funded improvement roadmap . Leadership ownership and support. KPI Metrics Dashboard	Aligned. Supported Assessed. Implemented



HOW DO YOU GO ABOUT IT?

Maturity Assessment Stages

Agree Maturity Assessment **purpose** and **scope**

Confirm Organisations product and business **Goals and Objectives** for Modelling and Simulation

Identify direct and indirect **stakeholders**

Identify key **information** and data **requirements**

Questionnaire and **discussion** with key stakeholders

Collate evidence and data

Align evidence and data to maturity **metric**

Maturity **Assessment**

Identify **strengths and weaknesses** and **scoring**

Identify potential **improvement approaches**

Develop **roadmap** and actions

Review potential **benefits and business case.**

Agree **plan**



• HOW DOES A MATURITY ASSESSMENT HELP?

- Provides a metric to **quantify** current status for the core M&S elements
- **Benchmark** your capability against best practice criteria
- **Identify** strengths, constraints, weaknesses, and opportunities affecting your M&S
- **Build** confidence in, and expand, your M&S capability
- **Maximise** collaboration and sharing
- **Improve** development efficiency and speed
- **Reduce** development, tool, and product costs
- **Target** and **prioritise** investment and improvement actions.
- **Measure** impact and progress.
- Ensure **balance** across essential capabilities
- **Prepare** for the future

Unlock the Potential of your M&S Capability to Achieve your Business Goals

NAFEMS Maturity Assessment Service

New service available from:



- An **independent assessment** of ALL aspects of your Modelling and Simulation capability
- Aligned to your product and business **goals**
- Uses an established **framework** to assess the strength and weaknesses of each of the core elements of an effective and efficient M&S capability
- Provides a **standardised** score reflecting the level of maturity of each of the core elements of your M&S capability compared with best practice
- Identifies areas the organisation should **target and prioritise** improvement action to achieve goals
- Provides a summary of potential **improvement** approaches and **options**

Element		Maturity							
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Find us on the NAFEMS stand





Thank You

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