

ASSESS 

ASSESS - INCOSE

Addressing the Changing Role of
Engineering Simulation

The Changing Role of Engineering Simulation

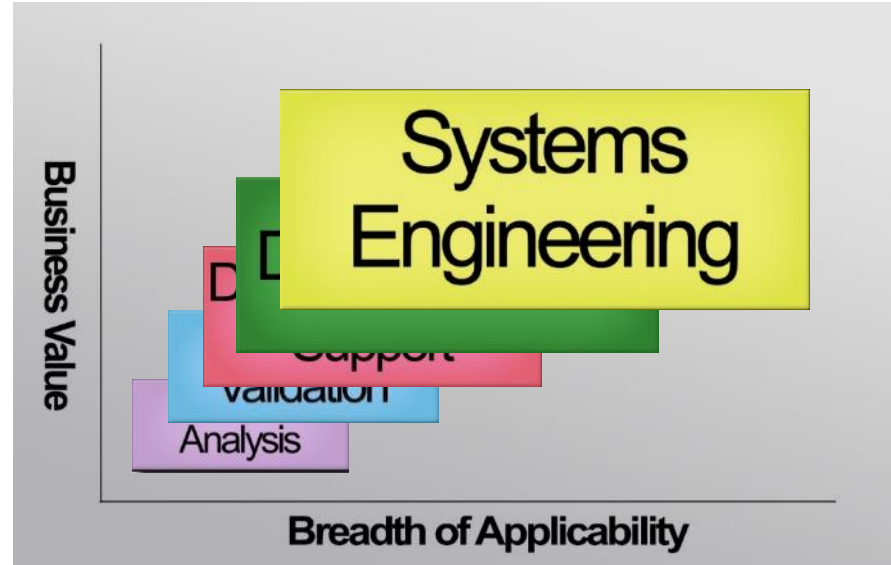


The Changing Role of Engineering Simulation

- Engineering Simulation is a term we use to cover Model-Based simulation tools for Analysis, Simulation, Systems Engineering and Simulation-Driven Design
- The use of Engineering Simulation has seen 10-15 % growth annually for about 30 years until 2008
- This cumulative growth now means that Engineering Simulation is a significant portion of the Engineering Software Market and a driver for future growth
- This has resulted in increased focus and investment in Engineering Simulation by major PLM software vendors
- This growth is coupled with increasing awareness by end user companies that Engineering **Simulation is the key** enabler **to Increased Competitiveness**
- The changing role of Engineering Simulation is more about it's role in business than the changes in technology

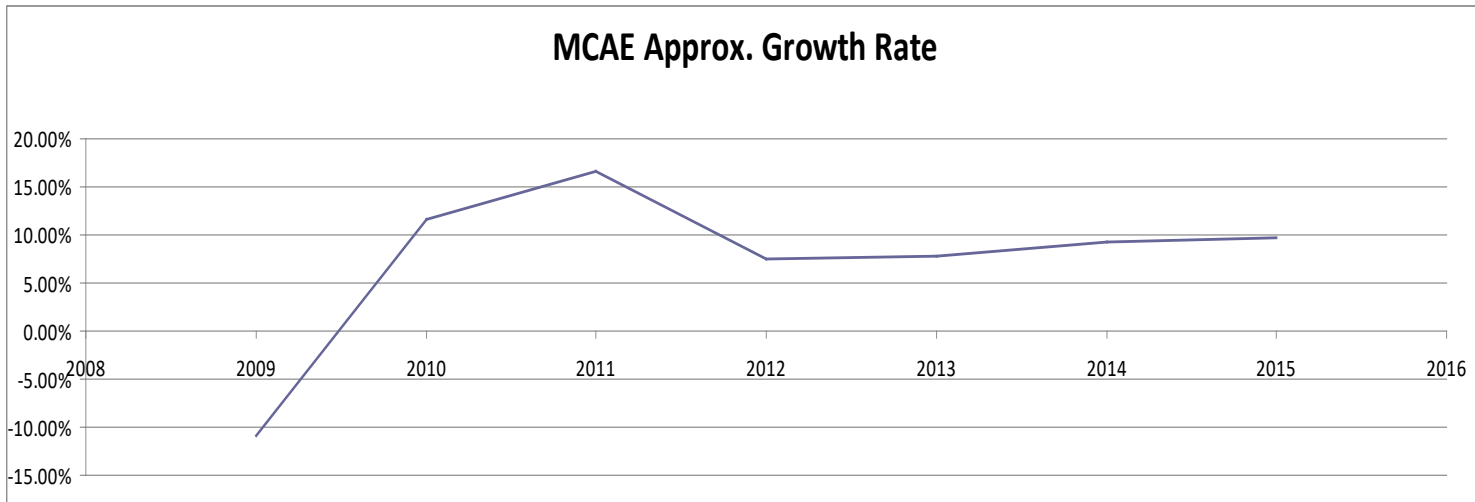
Technical Drivers for Engineering Simulation

- Failure Analysis
- Design Validation
- Design Decision Support
- Design Drivers
- Systems Engineering



Technical Drivers for Simulation

- intrinSIM looked at actual & projected MCAE Market growth since 2009 (Courtesy of Cambashi data observatories)



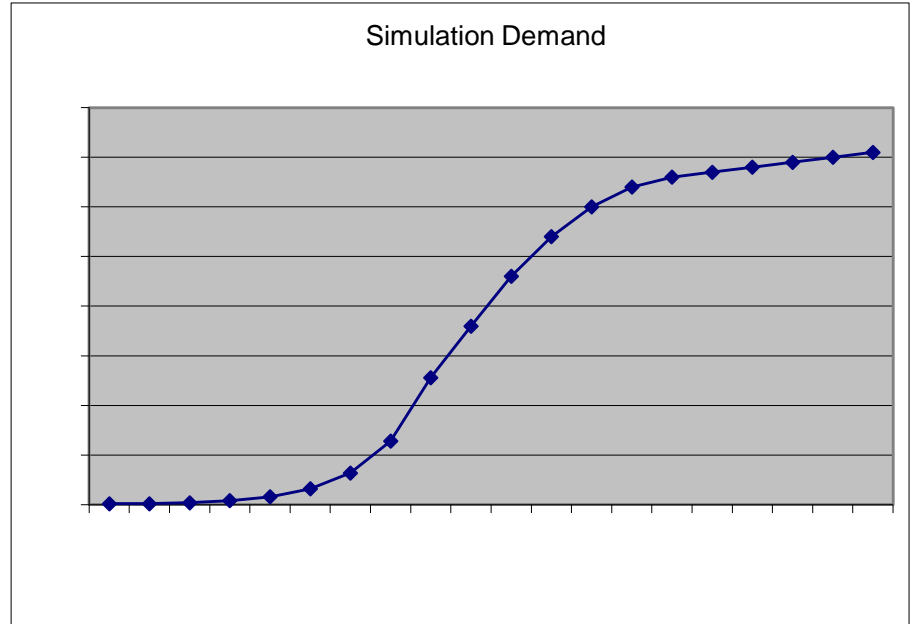
Business Drivers → Business Value

The Changing Role of Engineering Simulation is really about becoming a major key to strategic goals for improving competitiveness

- Increase Innovation
- Increase Quality
- Reduce Risk
- Reduce Time
- Reduce Cost

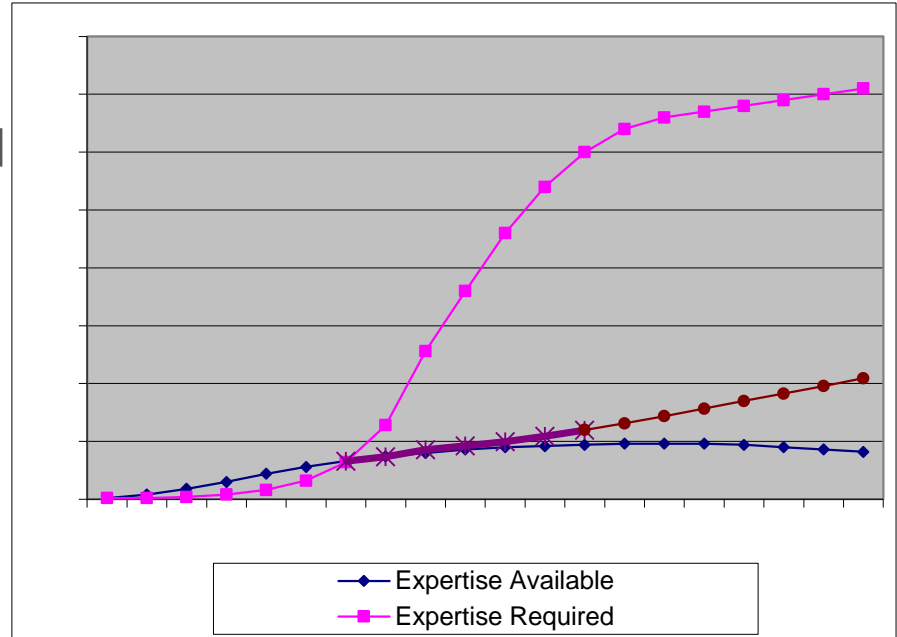
Business Value → Broader Demand

- Demand should be increasing on a classic S curve
- Is Engineering Simulation at an inflection point to break through ?



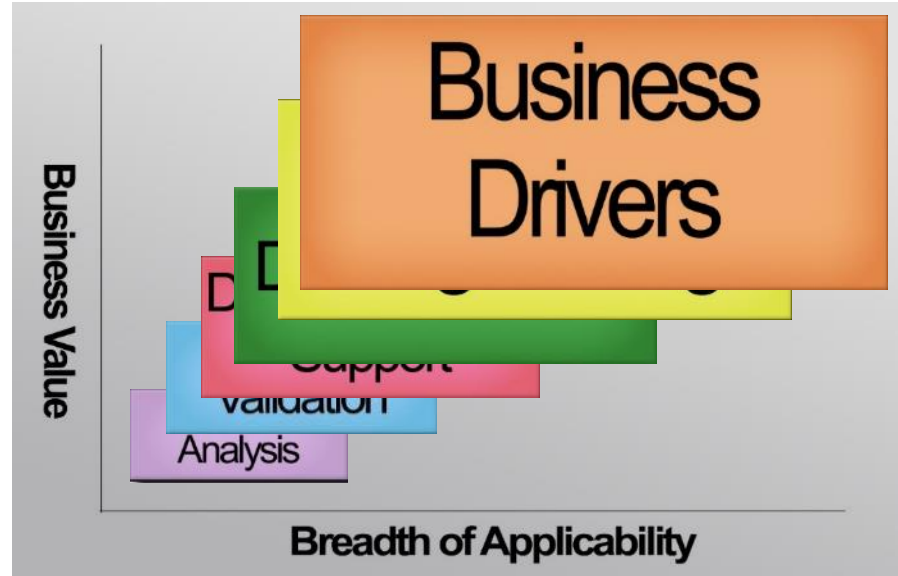
Business Value → Broader Demand

- Growth of the Engineering Simulation market is tempered due to lack of expertise available
- **Engineering Simulation is still done primarily by specialized experts**



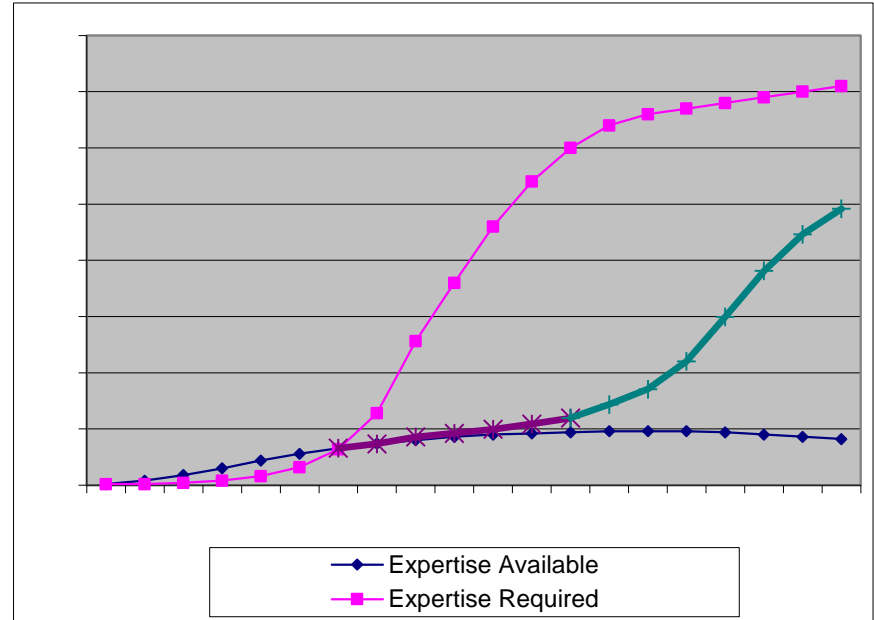
Business Drivers impact Engineering Simulation

- The Business Drivers are going to force a “**revolution**” to overcome the expertise based limitation
- Engineering Simulation will be forced to find a way



Business Drivers for Simulation

- The demand is not going away
- A **Simulation Revolution** will occur:
 - “Mobile”
 - “Smart”
 - “Integrated”
 - “Fit for purpose”
 - “Model-Based”
 - “Transparent” / “Invisible”



The ASSESS Initiative



ASSESS Initiative

- The **ASSESS Initiative** works to bring together key players to guide and influence strategies for software tools for model-based analysis, simulation, and systems engineering.
- Initially a collaboration of intrinSIM and Cyon Research.
- ASSESS Initiative LLC was formed mid 2016

ASSESS Initiative

- **The ASSESS Vision**

“To significantly expand the use and benefit of software tools for model-based analysis, simulation, systems engineering, and Simulation-Driven Design in the engineering applications domain.”

ASSESS Initiative

- ASSESS is a broad reaching multi-industry initiative which will interact and collaborate with multiple activities and organizations across the complete spectrum of model-based analysis, simulation and systems engineering including: NAFEMS, INCOSE, DMSCO, IEEE, CIMdata, Revolution in Simulation, and others.



ASSESS >>

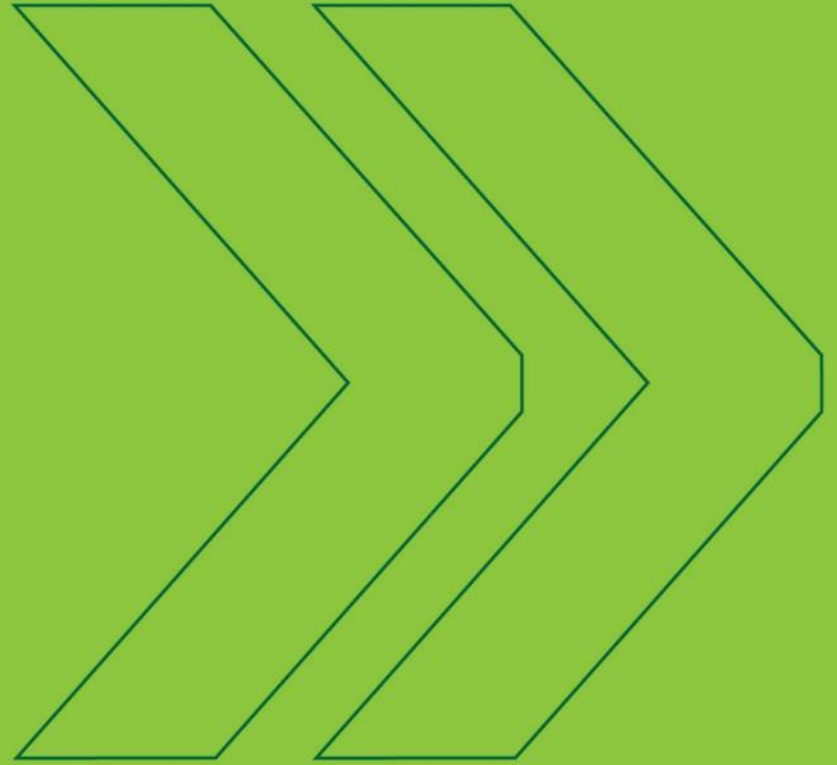
ASSESS Initiative

Summary of drivers behind the ASSESS Initiative

1. Growing demand on “How to be more competitive”
2. Exponentially growing complexity of products & processes
3. Available computing power is rapidly removing the computing bottlenecks
4. New world of 3D printed objects and light weighting is creating new simulation requirements
5. Entirely new applications are creating a rapidly growing demand for simulation to enable breakthroughs
6. Simulation is used almost exclusively by a limited number of expert analysts
7. Simulation efforts have three key but disjointed vectors
Commercial / Government / Research

ASSESS 

ASSESS Activities



ASSESS Activities



- ASSESS Summit (January 2015, Sante Fe, NM)
 - 40 Industry leading Ambassadors
 - 1 Keynote presentation (Richard Riff – retired from Ford)
 - 5 Working Groups
 - 8 key issues were highlighted
 - Design Centered Workflow
 - Ease of Use & Usability
 - Pre-CAD Analysis & Optimization
 - Impact of Web/Cloud/Mobile
 - Knowledge Capture & Reuse
 - Ability to Combine Heterogeneous Models in a Systems Approach
 - Appropriate Model Fidelity and role of Unsexy Stuff
 - Licensing Models Need to be Revisited



ASSESS >>

ASSESS Activities

- ASSESS 2016 Congress (January 2016, Potomac, MD)
 - 85 Industry leading participants
 - 4 Keynote presentations
 - Jesse Citizen – DMSCO
 - The Defense M&S Enterprise
 - Roger Burkhart – John Deere
 - Challenges of Collaboration through Shared Models
 - Zack Eckblad -- Intel
 - Democratization of Structural Analysis Using Meta-Code and Webapps
 - Rod Dreisbach – formerly with Boeing
 - Evolution, Revolution, & the Next New Generation of Engineering Simulation
 - 26 Technology Briefings



ASSESS Activities

- ASSESS 2016 Congress (January 2016, Potomac, MD)
 - 7 Working Groups each with a particular ASSESS related theme
 - Democratization of Engineering Simulation
 - Engineering Simulation Confidence / Governance
 - Business Challenges
 - Aligning Commercial, Government and Research Efforts
 - Potential Game Changers
 - Looking Forward
 - Integration of Systems and Detailed Sub-Systems Simulations



Integration of Systems & Detailed Sub-System Simulations

- **Mission/Goals/Objectives**
 - Aspire to find a single, well-integrated approach
 - Ease of use
 - Good and widely accepted standards
 - VV&A, UQ (component-based)
 - Libraries of accredited components

Integration of Systems & Detailed Sub-System Simulations

- **Major Issues**

- “SILOS”.
 - Lack of a common understanding that makes it possible to understand different silos from a common point of view.
 - Insufficient standards for communicating required information between/among silo-specific tools and formalisms.
 - Existing standardization efforts (e.g. FMI) are good, but very far from complete.
- Lack of funding / momentum

Integration of Systems & Detailed Sub-System Simulations

- **Recommendations**

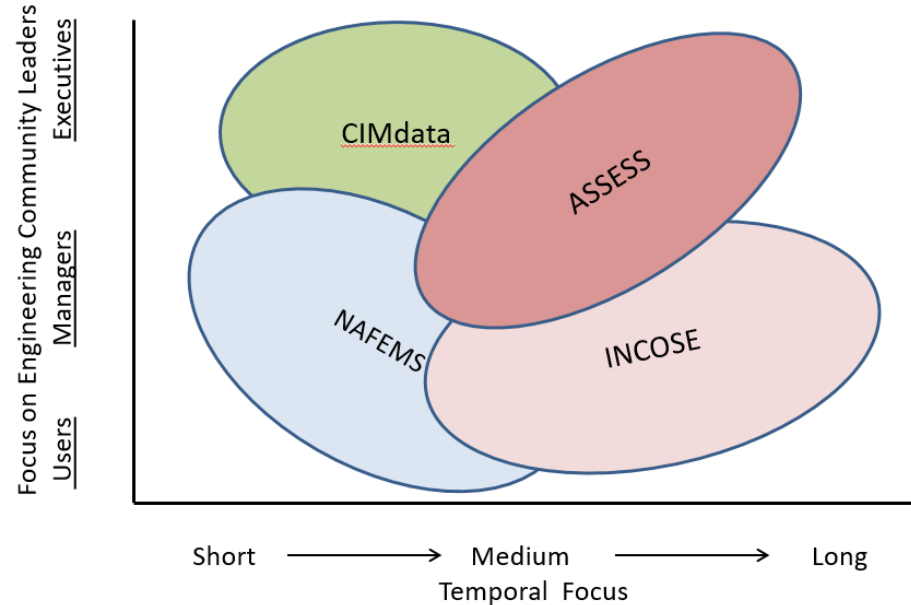
- Develop & Evolve Standards
 - Evolve existing
 - Develop New standards for integrating domain-specific tools and techniques.
 - Develop candidate reference implementations to test and refine possible standards.
- Develop & Evolve Best Practices
 - VV&A, UQ – best practices
- Develop libraries of accredited component models

Integration of Systems & Detailed Sub-System Simulations

- **Recommendations**

- Collaborate efforts with INCOSE & NAFEMS SMSWG
- ASSESS Initiative to focus on strategies and approaches to resolve the missing connection between systems simulations and detailed sub-system simulations

ASSESS Collaborations: Integration of Systems & Sub-System Simulations



ASSESS Activities

- ASSESS Initiative Advisory Committee
 - 57 Industry Thought leaders
 - 8 Working Groups focused on defining the future directions, activities and deliverables of the ASSESS Initiative
 - Annual Congress
 - Whitepapers
 - Resources
 - Webinars
 - Workshops
 -
 - 5 of the Working Groups are aligned with the “actionable” themes from the ASSESS 2016 Congress

ASSESS Activities

- Collaborations
 - INCOSE
 - NAFEMS
 - IEEE
 - Simulation in Revolution
 - CIMdata
 - intrinSIM/Cambashi (Market Research)
 - COFES/Cyon Research (Annual Congress)
 - ...

ASSESS Activities

- ASSESS 2017 Congress (November 1-3, 2017, Potomac, MD)
 - Targeting up to 150 industry leading participants
 - 2-3 Keynote presentations
 - 8 Technology Briefings
 - 8-10 Working Groups each with a particular ASSESS related theme
 - Democratization of Engineering Simulation
 - Engineering Simulation Confidence / Governance
 - Business Challenges
 - Aligning Commercial, Government and Research Efforts
 - Potential Game Changers
 - Looking Forward
 - Integration of Systems and Detailed Sub-Systems Simulations
 - Other themes TBD



The ASSESS Initiative



ASSESS Initiative

- The **ASSESS Initiative** was formed to bring together key players to guide and influence strategies for software tools for model-based analysis, simulation, and systems engineering.

Questions

