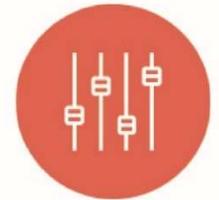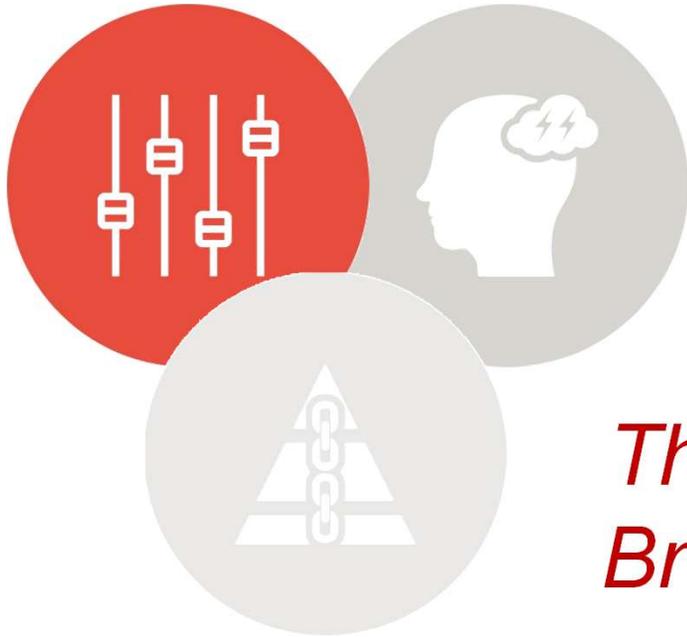Simulation 20/20:
The Next 5 Years

The Business, Technological and Human Enablers
Driving Change Over the Next Five Years

NAFEMS

Democratization   Simulation Governance   Business Challenges

For more information, visit:
nafems.org/2020

Business Challenges:
The Changing Role of Simulation Brings New Business Challenges

Speakers

Andrew Wood, NAFEMS

Joe Walsh, ASSESS

Democratization   Simulation Governance   Business Challenges

Agenda

Welcome and Introduction	*Andrew Wood*
An Introduction to the Business Challenges "2020" Series	*Joe Walsh*
The Changing Role of Simulation Brings New Business Challenges	*Joe Walsh*
Q&A and Discussion	*Joe Walsh*

About NAFEMS

NAFEMS is the International Association for the Engineering Modeling, Analysis and Simulation Community

Nearly 1200 companies worldwide are members of NAFEMS, encompassing industrial practitioners, vendors and academic institutions.
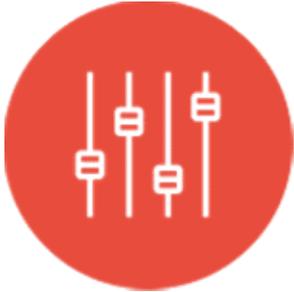
As a not-for-profit organization, our principal aims are to:

- **Improve the professional status** of all persons engaged in the use of engineering simulation

- Establish **best practices** in engineering simulation

- Provide a focal point for the **dissemination and exchange of information** and knowledge relating to engineering simulation

- Promote **collaboration** and communication

- Act as an **advocate** for the deployment of simulation

- Continuously improve the **education and training** in the use of simulation techniques

- Be recognized as a **valued independent authority** that operates with neutrality and integrity
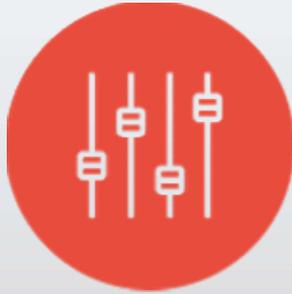
Introduction to 2020 Series

- *What is the future for engineering analysis and simulation?*
- *What factors are constraining growth potential?*
- *How can we realize its full potential?*
- *Where will it lead us in the next decade?*

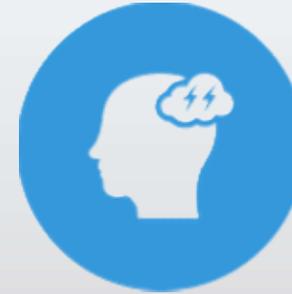| Democratization	Simulation Governance	Business Challenges
➢ Expert Knowledge Capture & Reuse ➢ Usability ➢ Accessibility ➢ Next-Generation Computing Architectures	➢ Verification, Validation ➢ Uncertainty Quantification ➢ Risk Management ➢ Simulation Deployment	➢ ROI ➢ Licensing Models ➢ Communication ➢ Influence of SMEs ➢ Vendor & End-User Collaboration

Democratization

August
to
November

Simulation Governance

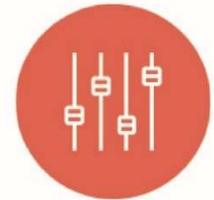December
to
June

Business Challenges

June
to
October

NAFEMS AMERICAS CONFERENCE 2016
June 7-9
Seattle

THANK YOU

andrew.wood@nafems.org

Disclaimer: NAFEMS is a vendor-neutral technology advocate. The views expressed during today's webinar are the personal opinions of the speakers, and do not necessarily reflect the viewpoint of NAFEMS. This series is meant to address key topics that are posing the greatest challenges to NAFEMS members in the Americas' region, but global participation in this activity is welcomed.

Simulation 20/20:
The Next 5 Years

The Business, Technological and Human Enablers
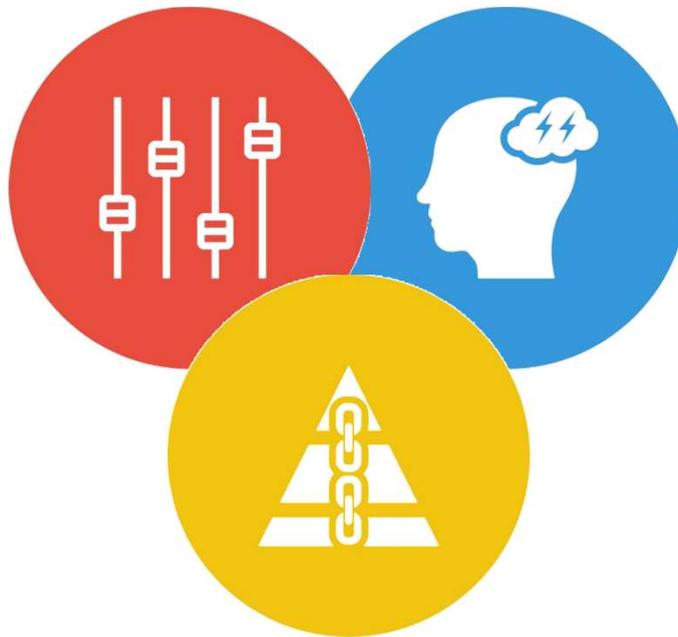Driving Change Over the Next Five Years

NAFEMS

Democratization   **Simulation Governance**   **Business Challenges**

For more information, visit:
nafems.org/2020

An Introduction to the Business Challenges "2020" Series

Mr. Joe Walsh
Leader, ASSESS

9

Democratization   Simulation Governance   Business Challenges

The Changing Role of Simulation brings new Business Challenges
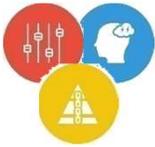
NAFEMS 20-20
WEBINAR SERIES

Business Challenges Webinars

- Prompted by ASSESS Initiative

- The ASSESS Vision

    "To significantly expand the use and benefit of software tools for model-based analysis, simulation, and systems engineering in the engineering applications domain."

ASSESS
ANALYSIS, SIMULATION
& SYSTEMS ENGINEERING
SOFTWARE STRATEGIES

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.
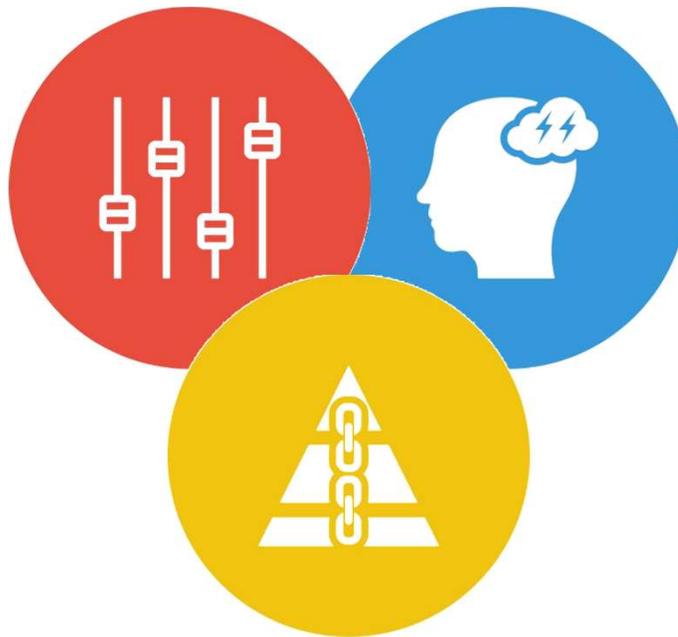
ASSESS Initiative

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

Democratization   Simulation Governance   Business Challenges

Business Challenges Webinars

- June (Introduction to the Business Challenges series)
  - The Changing Role of Simulation Brings New Business Challenges (Joe Walsh)
- July
  - Simulation ROI (Richard Riff / Bob Deragisch)
- August
  - Non-technical /executive Communication (Alexander Karl / Frank Popielas)
- September
  - Licensing Model Pressures (Monica Schnitger / Don Tolle)
- October
  - Influence and issues related to Small/Medium sized Enterprises (TBD)
- November
  - Improved Vendor & End-User Collaboration (Boeing / BMW)

The Changing Role of Simulation Brings New Business Challenges

Joe Walsh
Leader, ASSESS

Democratization   Simulation Governance   Business Challenges

The Changing Role of Simulation brings new Business Challenges
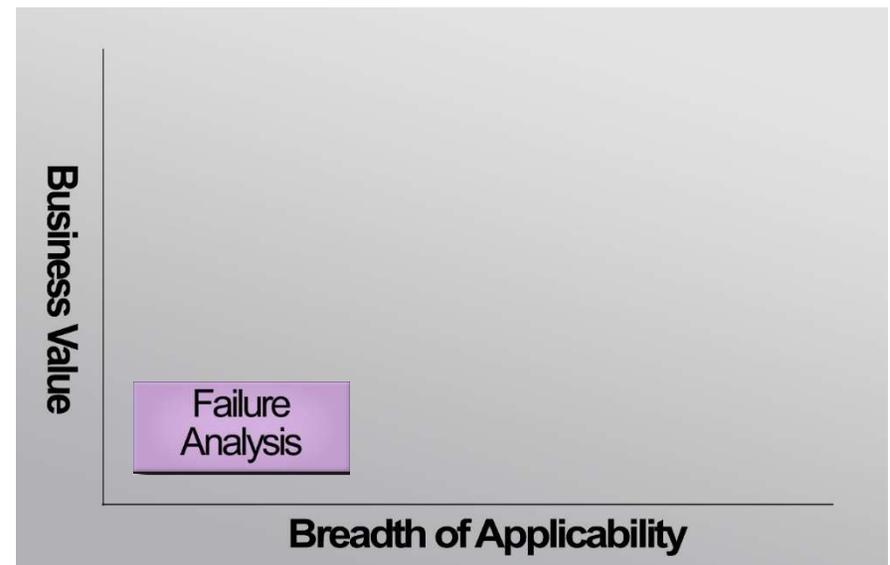
NAFEMS 20-20
BUSINESS CHALLENGES

The Changing Role of Simulation

- The use of Simulation has seen 10-15 % growth annually for about 30 years until 2008
- This cumulative growth now means that 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 simulation by major PLM software vendors
- This growth is coupled with increasing awareness by end user companies that **Simulation is** the key enabler to **Increased Competitiveness**
- The changing role of simulation is more about it's role in business than the changes in technology
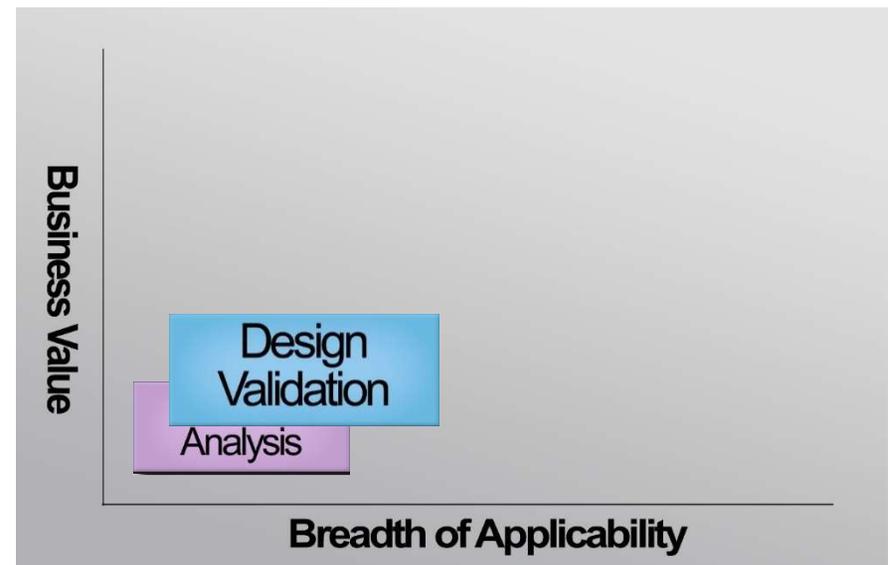
Technical Drivers for Simulation

- ## Failure Analysis

Technical Drivers for Simulation

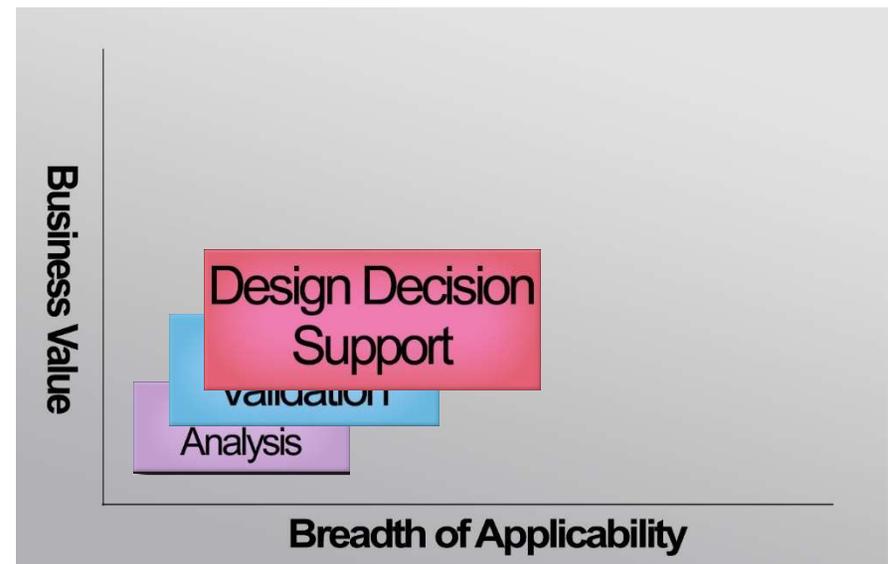- Failure Analysis
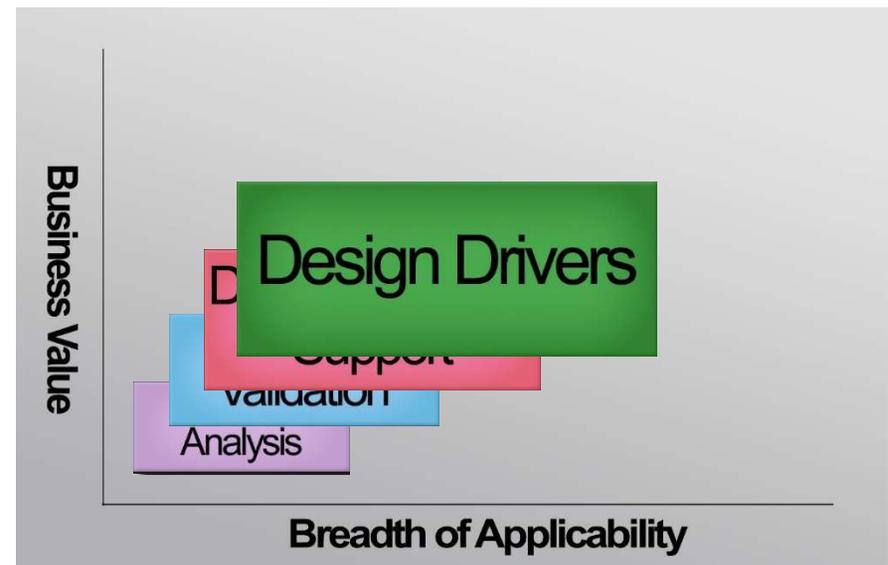- Design Validation

Technical Drivers for Simulation

- Failure Analysis
- Design Validation
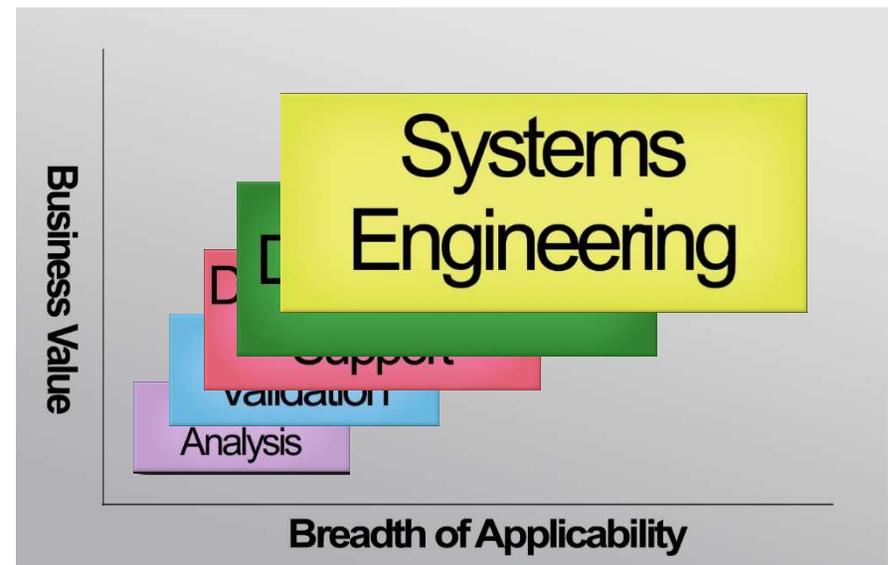- Design Decision Support

Technical Drivers for Simulation

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

Technical Drivers for 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)

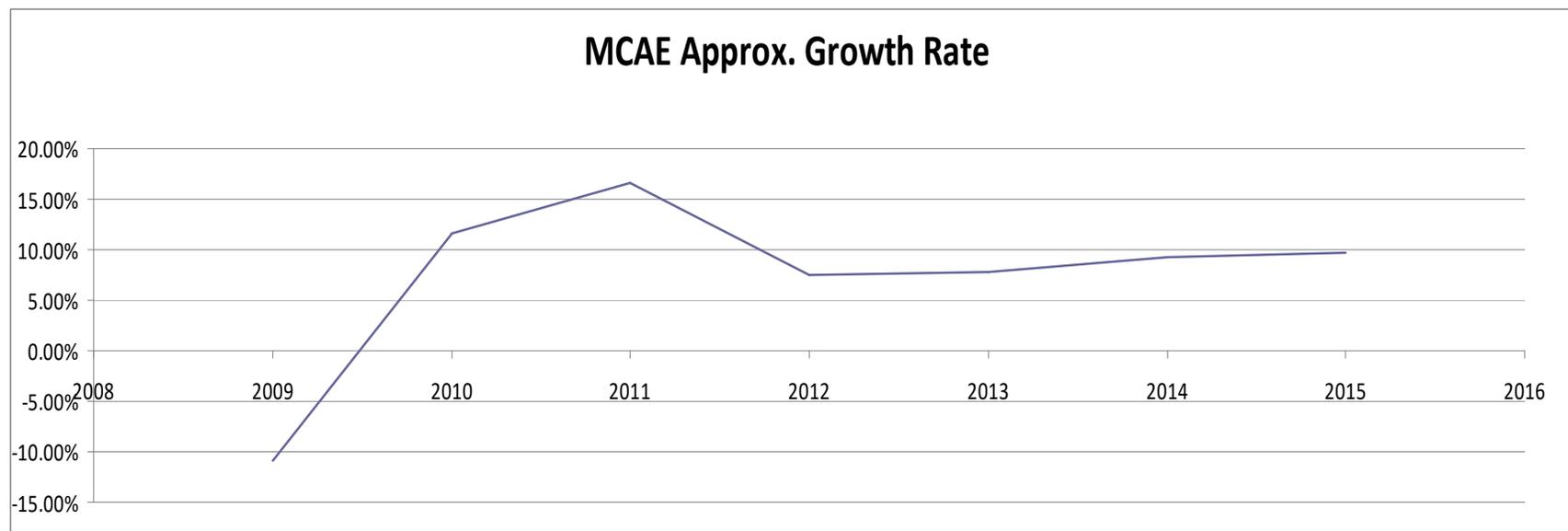Democratization   Simulation Governance   Business Challenges

Technical Drivers for Simulation

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

MCAE Approx. Growth Rate

Democratization   Simulation Governance   Business Challenges
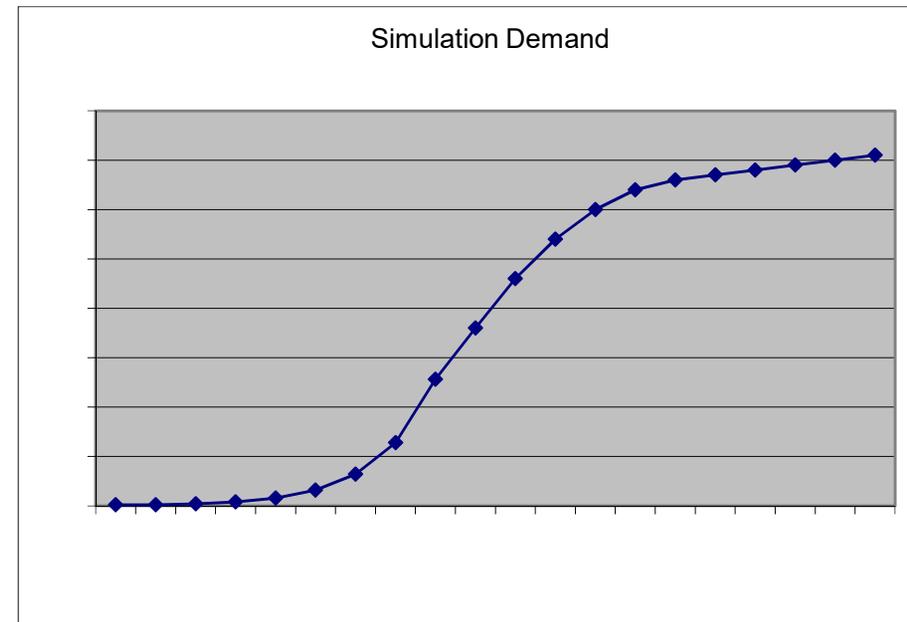
Business Drivers ➔ *Business Value*

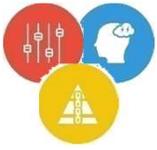The Changing Role of Simulation is really about business benefits

- **Innovation is a major key to Competitiveness**
  - Simulation is a major key to innovation
- **Risk management is a major key to Competitiveness**
  - Simulation is a major key to understanding and managing risk
- **Reducing cost is a major key to Competitiveness**
  - Simulation is a major key to reducing material, prototyping & product development cost

Business Value ➔ *Broader Demand*
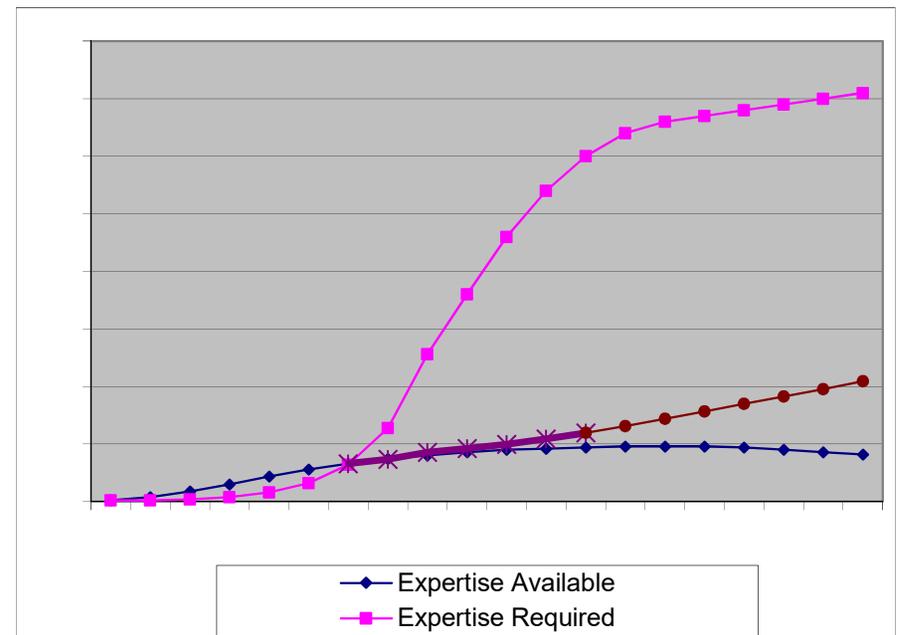
- Demand should be increasing on a classic S curve

- Is simulation at an inflection point to break through ?

Simulation Demand

Business Value ➜ Broader Demand
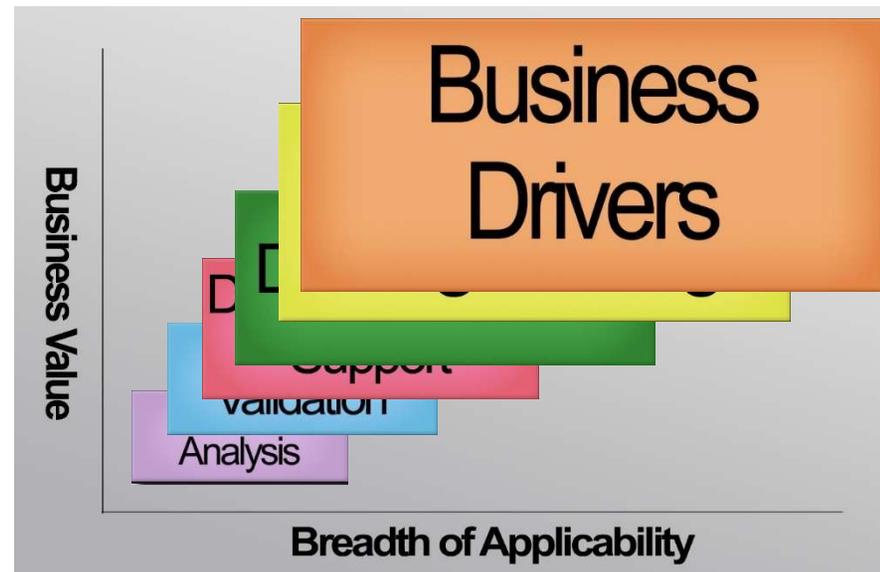
- **Simulation** is **still** done primarily **by** specialized **Analysts**

- Growth of MCAE market is tempered due to lack of expertise available

Legend:
- Expertise Available
- Expertise Required

Business Drivers for Simulation
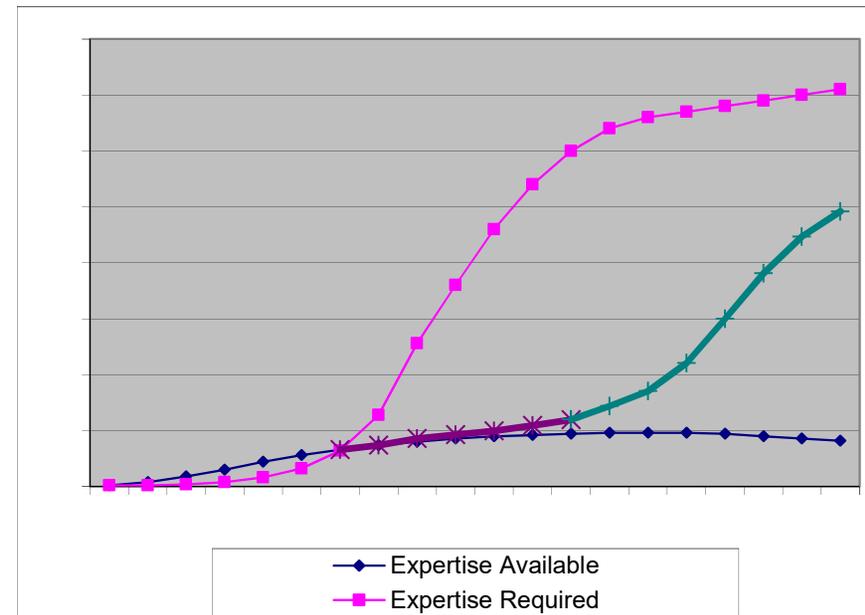
- Business Drivers are going to force a "**revolution**" to overcome the expertise based limitation

- Simulation will be forced to find a way

Business Drivers for Simulation

- The demand is not going away

- A **Simulation Revolution** will occur:
  - "Fit for purpose"
  - "Smart"
  - "Integrated"
  - "Transparent"

Legend:
- Expertise Available
- Expertise Required

7 Key Simulation Drivers

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
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 Related Activities

NAFEMS Americas 2014
(May 2014– Colorado Springs, CO)
- Invited presentation on "Changing Role of Simulation" spurred creation of ASSESS Initiative

ASSESS Summit
(January 2015 – Sante Fe, NM)
- 40 attendees
- 5 Working Groups

COFES 2015
(April 2015 – Scottsdale, AZ)
- ASSESS Update Session
- ASSESS Roundtable

NAFEMS World Congress 2015
(June 2015– San Diego, CA)
- Invited presentation on "Changing Role of Simulation"

ASSESS 2016 Congress
(January 2016 – Potomac, MD)
- 85 attendees
- 7 Working Groups

ConnectPress Webinar
- Changing Role of Simulation

NAFEMS 20/20 Webinars
- CAE Democratization track – completed
- Simulation Governance track – completed

COFES 2016
(April 2016 – Scottsdale, AZ)
- ASSESS Update Session
- ASSESS Initiative advisory committee meeting

ASSESS Related Activities (cont.)

NAFEMS Americas 2016 (June 16 – Seattle, WA)

- Keynote presentation for ASSESS Update
- CAE Democratization track
- Simulation Governance track
- Business Challenges track

• NAFEMS 20-20 Webinars

- CAE Democratization track - completed
- Simulation Governance track – completed
- Business Challenges track
  - starts June 28th

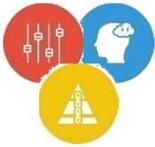## ASSESS 2017 (Preliminary target of Oct 18-20 – location TBD)

- Washington, DC
- Atlanta, GA
- Boulder, CO
- Ann Arbor, MI

ASSESS SUMMIT

- 40 Ambassadors
- 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

ANALYSIS, SIMULATION & SYSTEMS ENGINEERING
SOFTWARE SUMMIT

ASSESS 2016 CONGRESS

- 85 Attendees
- 7 Themes / Working Groups
  1. **D**emocratization **o**f **E**ngineering **S**oftware (DoES)
     - led by-- Monica Schnitger (Schnitger Corp.) / Karlheinz Peters (intrinSIM)
  2. Simulation Confidence
     - led by-- Keith Meintjes (CIMdata)
  3. Business Challenges
     - led by– Marc Halpern (Gartner)
  4. The Intersection of Systems Modeling and Classical Simulation
     - led by– Don Tolle (CIMdata)
  5. Aligning Commercial, Government & Research Interests and Efforts
     - led by– Dennis Nagy (BeyondCAE)
  6. Potential Game Changers
     - led by– Andreas Vlahinos (AES)
  7. Looking Forward
     - led by– Jack Ring (Educe) / Bruce Jenkins (Ora Research)

ASSESS 2016
ANALYSIS, SIMULATION & SYSTEMS ENGINEERING
SOFTWARE STRATEGIES

Business Challenges

- ## Key Factors
  - Licensing models (September)
    - Business impact of web cloud/mobile
  - Value proposition of Simulation (July)
  - Communication with non-technical executives (August)
  - Role of untapped Small/Medium Enterprises (October)
  - Improved Collaboration (November)

Business Challenges

- The changing role of simulation is more about it's role in business than the changes in technology

- Business Drivers are going to force a "**Simulation Revolution**" to occur to overcome the current expertise based limitation

Business Challenges

- The **Simulation Revolution** will bring a new set of Business Challenges that will need to be addressed
  - Licensing models including impact of web cloud/mobile
  - Value proposition of Simulation
  - Communication with non-technical executives
  - Role of untapped Small/Medium Enterprises
  - Improved Collaboration

Learn more about ASSESS

http://assessevent.com/

Or email

joe.walsh@intrinSIM.com

Business Challenges Webinars

- July
  - Simulation ROI (Richard Riff / Bob Deragisch)
- August
  - Non-technical /executive Communication (Alexander Karl / Frank Popielas)
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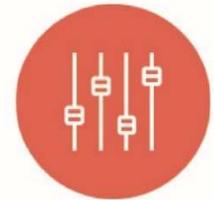
Joe Walsh

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Q&A SESSION

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