

ASSESS 

ASSESS Progress Report

2017 CAE Geometry Workshop

An Engineering Simulation Revolution



An Engineering Simulation Revolution

- **Engineering Simulation is rapidly being recognized as a key enabler to Increased Competitiveness**
 - Increase Innovation
 - Increase Quality
 - Reduce Risk
 - Reduce Time
 - Reduce Cost



ASSESS >>

An Engineering Simulation Revolution

- The Engineering Simulation Revolution is about making **Engineering Simulation widely available & appropriate** to support improved decision making throughout the entire life-cycle of engineered products and processes

The ASSESS Initiative



The 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.

The 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.”

The ASSESS Initiative

- ASSESS Themes
 - Democratization of Engineering Simulation ([DoES](#))
 - Engineering Simulation Confidence & Governance ([Confidence](#))
 - Integration of Systems and Detailed Sub-System Simulations ([Systems](#))
 - Alignment of Government / Research/ Commercial Activities ([Align](#))
 - Engineering Simulation Business Challenges ([Business](#))
 - Generative Design (**Generative**)

Enabling the Engineering Simulation Revolution



Enabling the Engineering Simulation Revolution

- **Technologies**

- Increased emphasis on purpose built applications
- Model Based Systems Engineering
- Emergence of simulation knowledge capture & reuse (KARREN)
- Emergence of near real time / near physics approaches
- IoT access to “real” data & “digital/Hybrid Twins”

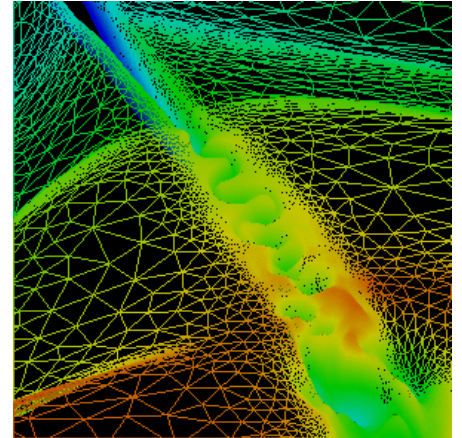


ASSESS >>

Enabling the Simulation Revolution

- **Approaches**

- Focusing on automation for appropriate accuracy for effective decision support
- Focusing on accuracy driven methods
- Focusing on application rather than physics
- Increasing the emphasis on Model Based Systems Engineering

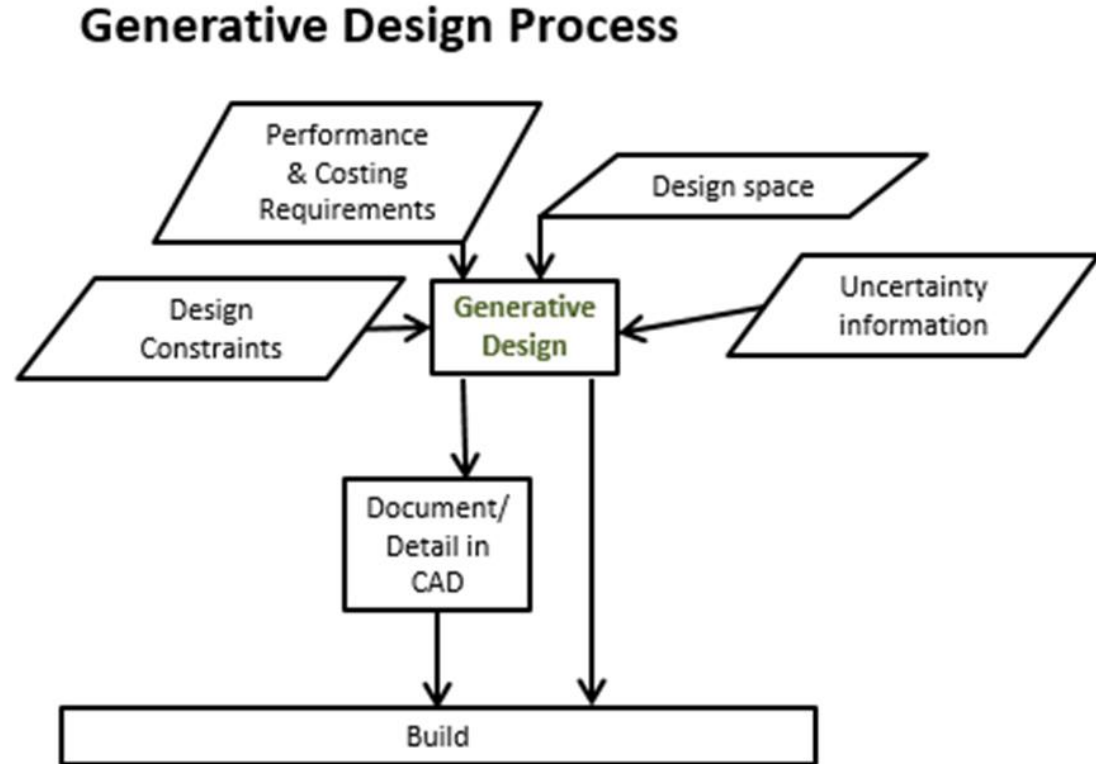


ASSESS »

Enabling the Simulation Revolution

- **Approaches**

- Driving design from requirements and available design space – Generative Design

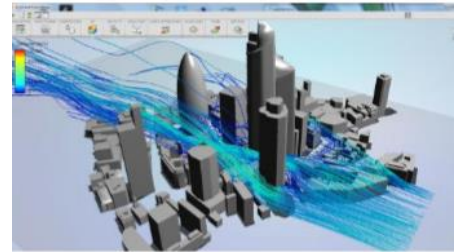
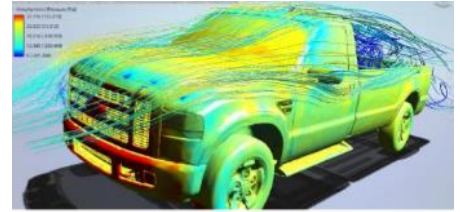


Impact on the future of CAE Geometry



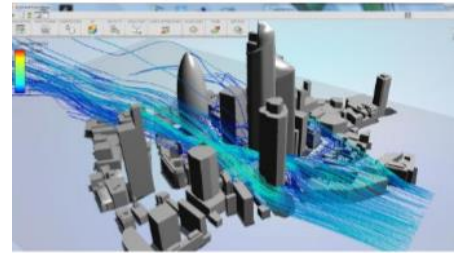
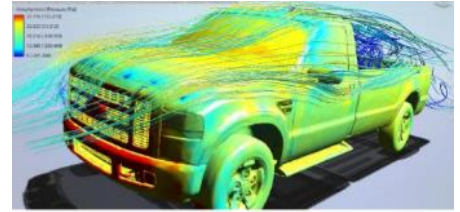
Impact on the future role of CAE Geometry

- Focus on **automation for appropriate accuracy** for effective decision support
 - Increased emphasis on “smart” automated problem specific idealizations accounting for:
 - What physics & boundary conditions
 - What are the characteristics of interest
 - Impact on desired accuracy
 - Uncertainty of geometric parameters
 - Adaptive geometry representations



Impact on the future role of CAE Geometry

- Focusing on **automation for appropriate accuracy** for effective decision support
 - Short-mid term needs:
 - Automated dimensional reduction
 - especially mid-surface extraction
 - Automated “Analysis Feature” recognition and suppression
 - Automated handling of hybrid models
 - Automated adaptive geometry based on solution adaptivity



ASSESS »

Impact on the future role of CAE Geometry

- **Emergence of simulation knowledge capture & reuse**
 - Exchange of Parameters rather than models
 - Introduces a need for application specific “**Generative Models**” that can be generated fresh from a set of parameter values
 - Generates different model representation from a common set of parameters
 - Needs a “generative model” definition
 - Needs a common parameter database

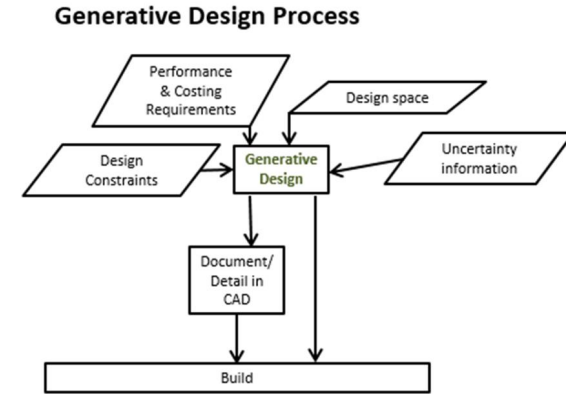


ASSESS >>

Impact on the future role of CAE Geometry

- **Generative Design**

- Simulation defines geometry to meet requirements
 - See “Automation of Appropriate”
 - Needs to support multiple geometry representations
 - Needs to support conversion from multiple geometry representations
 - Needs to support key feature & parameter extraction on various forms of geometry



The ASSESS Initiative



The 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.”

The ASSESS Initiative

- **ASSESS 2017 Congress (November 1-3 2017, Potomac, MD)**
 - ~100 industry leading participants
 - 2 Keynote presentations
 - 8 Technology Briefings
 - 16 Working Sessions focused on the 8 ASSESS related themes with 2 sessions each



ASSESS >>

Questions ?

