AM-Bench: A proposed benchmarking series for additive manufacturing

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Proposal:
Put together a dedicated conference series on “Simulations for Additive Manufacturing” with computational benchmarks as a key component.

modeled after the NUMISHEET benchmark
Additive Manufacturing Benchmark Test Series (AM-Bench)

Description:
A continuing series of highly controlled benchmark tests for additive manufacturing, in conjunction with a conference series.

Goals:
1. To allow modelers to test their simulations against rigorous, highly controlled additive manufacturing benchmark test data
2. To encourage additive manufacturing practitioners to develop novel mitigation strategies for challenging build scenarios

Scope:
Metals and polymers using multiple build methods will be supported.

First Conference Venue:
National Institute of Standards and Technology
Gaithersburg, MD
AM Bench Steering Committee

Scientific Advisory Committee

Local Organizing Committee

Benchmark Test #1 Committee
Benchmark Test #2 Committee
Benchmark Test #3 Committee

Challenge Classes
1 - Model
2 - Build

Builds - *In-situ* Measurements - Dimensions – Microstructure – Properties

Periodic Conference to Compare Results
AM-Bench Exploratory Committee

Role of Committee:

- Define benchmark tests
- Define stakeholders
- Determine scope and organization structure

40 participating organizations, 59 members

AFRL, ARL, NRL
NASA (Ames, Glenn, Goddard, Marshall, JPL)
ANL, LANL, LLNL, NIST, ORNL, Sandia
National Academies
EWI, Quad City Manuf. Lab.
3DSIM, ESI Group (France), GE Global Research, Honeywell, IHI Corporation (Japan), Lockheed Martin, MadeInSpace, Pratt & Whitney, QuesTek, UTRC
Clemson, CMU, Imperial College (UK), Luleå Univ. Tech. (Sweden), Northwestern, MS State, NIU, Purdue, TX A&M, U. AL, UConn, U. TX El Paso, U. Wisc.
AM-Bench Status and Plans

1. 4th (final) draft of foundational documents are being written with input from Exploratory Committee
2. AM-Bench International Steering Committee will be assembled
3. Current Exploratory Committee will become the Scientific Advisory Committee
4. Local Organizing Committee for first conference (at NIST) will be assembled
5. First set of benchmark tests and volunteers (from multiple organizations) will be selected
6. Timeline will be determined and announced
7. Work on first set of benchmark tests will commence