

GMGW-2

Case 2: Remeshing of the HL-CRM

Carolyn Woeber
Pointwise, Inc.

James Masters
Arnold Engineering Development Complex

David McDaniel
DoD HPCMP CREATE™ / Univ of Alabama Birmingham

2nd Geometry and Mesh Generation Workshop
January 5-6, 2019
San Diego, CA

Outline

- Case Overview
 - Organizing Committee
 - Goals
 - Requirements
 - Participant Statistics
- AIAA Special Session

Organizing Committee

John Chawner and Carolyn Woeber*
Pointwise, Inc.

John Dannenhoffer
Syracuse University

Mark Gammon
ITI

Carl Ollivier-Gooch
University of British Columbia

Bill Jones
NASA Langley

Jim Masters* and David McDaniel*
Arnold Engineering Development Complex

Todd Michal
The Boeing Company

Nigel Taylor
MBDA UK Ltd.

Hugh Thornburg
Engility

***Case 2 Analysis Team**

Case Goals

Generate an **Order 8.5** (316 million cells, medium) resolution mesh for the HL-CRM Rev. 2 geometry model.

$$\text{Order} = \text{Log}_{10} (\text{Mesh Size})$$

Year	Miniscule	Tiny	XCoarse	Coarse	Medium	Fine	XFine	Super Fine	Hero
2018	3.16M	10M	31.6M	100M	316M	1B	3.16B	10B	31.6B
2021	10M	31.6M	100M	316M	1B	3.16B	10B	31.6B	100B
2024	31.6M	100M	316M	1B	3.16B	10B	31.6B	100B	316B
2027	100M	316M	1B	3.16B	10B	31.6B	100B	316B	1T
2030	316M	1B	3.16B	10B	31.6B	100B	316B	1T	3.16T

Generate a mesh family by creating coarse, fine, and/or extra fine resolutions (Orders 8, 9, and 9.5 respectively).

*C. Ollivier-Gooch, Mesh Size Naming Conventions, www.gmgworkshop.com/resources

Case Requirements

- Use the gapped flap version of the HL-CRM Rev 2 geometry model (NX, Parasolid, STEP, IGES).
- Create an Order 8.5 resolution mesh according to the GMGW-1/HiLiftPW-3 gridding guidelines*.
- Create remaining meshes in family (Orders 8, 9, and 9.5).
- Complete Participant Questionnaire during process to record data:
 - Geometry Import and Prep
 - Surface Meshing
 - Volume Meshing
 - Mesh Validity and Quality Assessment
 - Mesh Output
 - New Best Practices, Techniques, or Algorithms
- Submit Mesh(es) and Participant Questionnaire

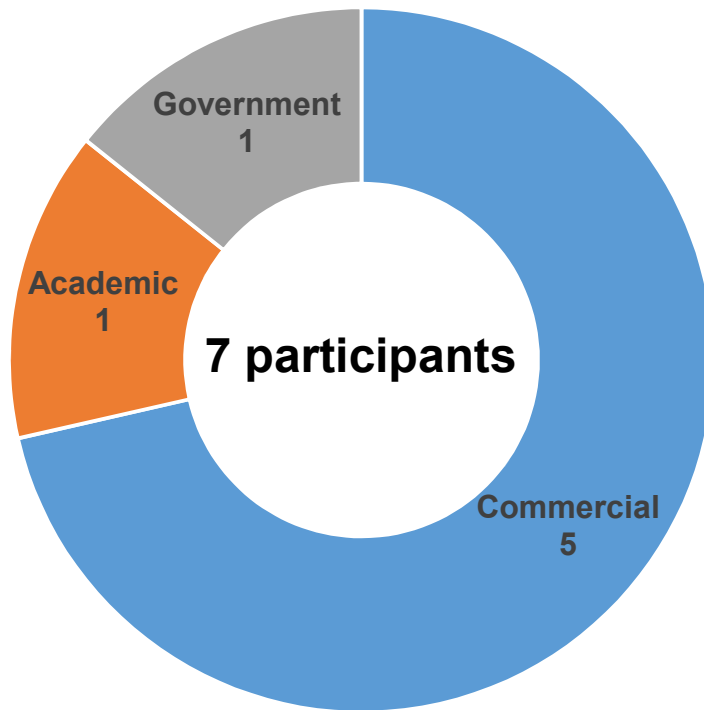
*<https://hiliftpw.larc.nasa.gov/Workshop3/GriddingGuidelines-HiLiftPW3-v10.pdf>

Participants

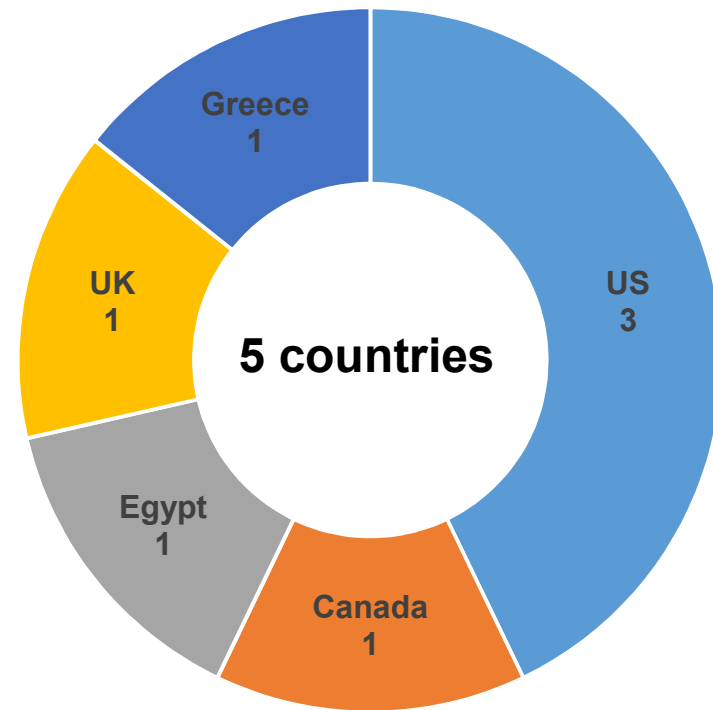
Marker	Participant ID	Name	Affiliation	Mesh Order
A	04	Brian Edge	Metacomp Technologies	8.5
A				9.13
B	10	Amine Ben Haj Ali	Bombardier	8.16
C	14	Pei Li Todd Michal	The Boeing Company	8.5
D	15	Ahmed Kabil	Zewail City University	8.27
E	17	Andy Wade Gandhar Parkhi Vinod Mahale	ANSYS	8.5
F	18	Romain Aubry Saikat Dey E. Mestreau M. Williamschen D. Williams	CREATE-AV	8.6
G	20	Vangelis Skaperdas Antonios Karasavvidis	Beta CAE	8.45

Participant Demographics

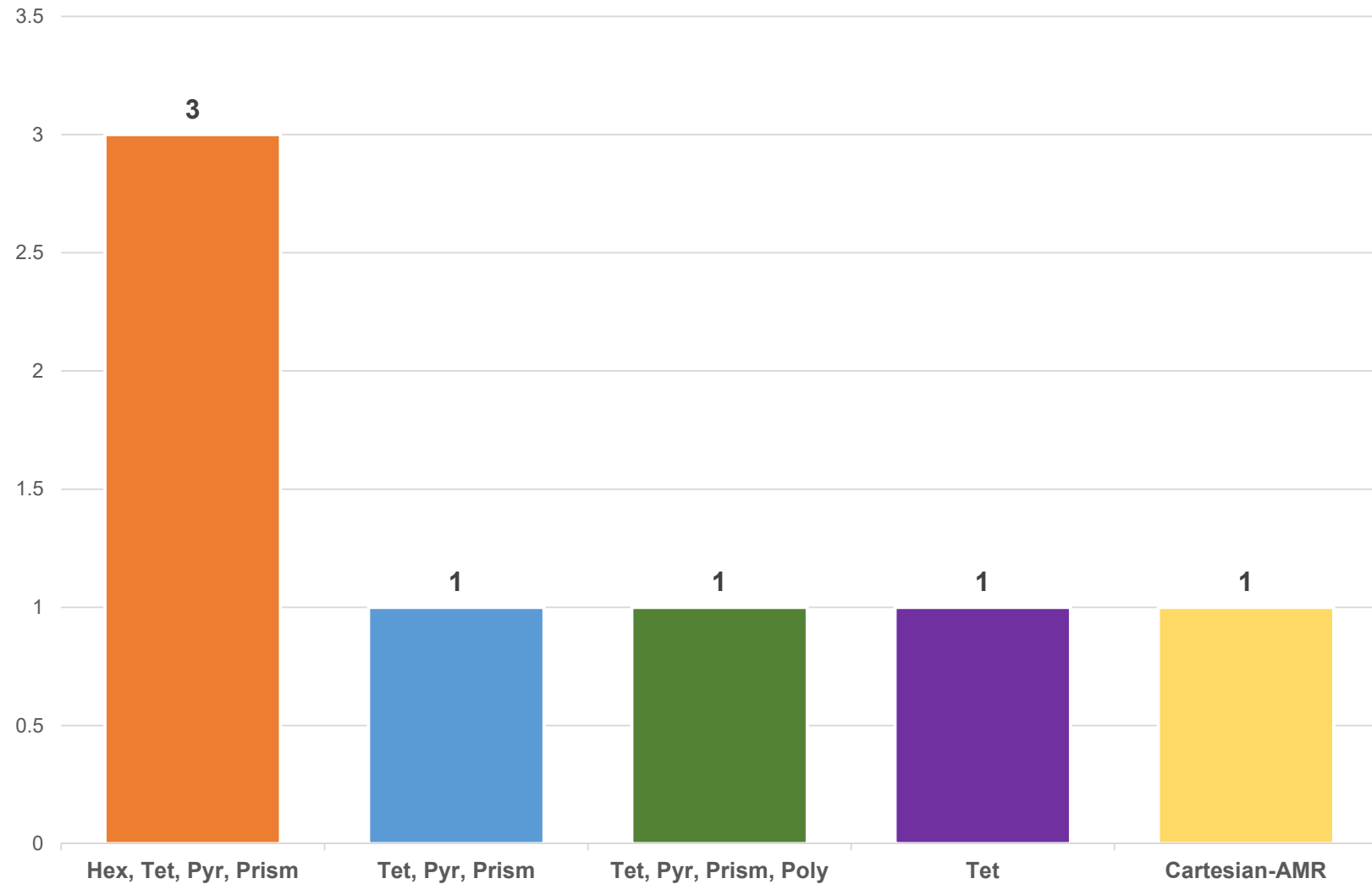
Organization Type



Location



Participant Mesh Types



AIAA Aviation Special Session

- Summary of Case 1 participant questionnaires will be presented at the end of this session.
- Special session planned for AIAA Aviation 2019 (Dallas, TX) will include an additional summary presentation.
 - Opportunity for analysis team to review participant data in more depth.
 - Additional lessons learned will be shared with the CFD community.