AIAA

HLPW6: Scale-Resolving Simulation Technology Focus Group

Konrad Goc (Co-Leader, Emphasis: WMLES), Boeing

Eduardo Molina (Co-Leader, Emphasis: HRLES), Embraer

Daniel Heathcote (Deputy), Aurora Flight Sciences

Meeting

April 21st, 2026

HLPW6: SRS TFG (Repeat)

- HLPW6 Website: https://aiaa-hlpw.org/
- If you have not yet, join Workshop TFG DL by sending an email to **konrad.a.goc@boeing.com**
- Meeting schedule: bi-weekly on Tuesdays 7 am PST/10 am EST
  - Meeting Link
- Can join as:
  - Active participant (attend meetings & run simulations)
  - Limited participant (attend meetings & run *some* simulations)
  - Observer (attend meetings only)

Will be assigned participant ID's, PID's (Active and Limited participants)

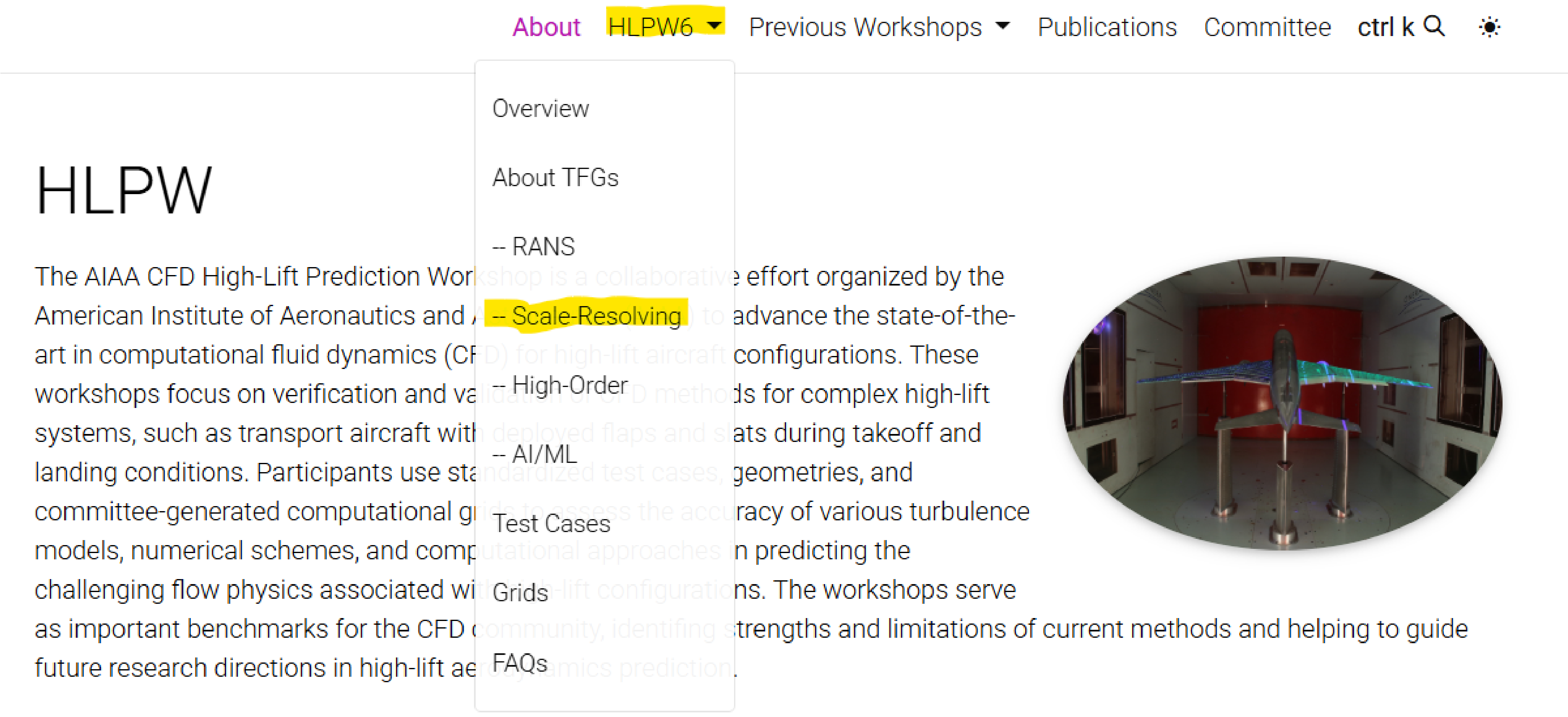
Schedule (Updated)

- **Test Case 1** – CRM-HLS: January to May 2026
    - Info: https://aiaa-hlpw.org/HLPW6/cases
    - Looking for willing participants to run **WRLES/DNS**.
    - **Mini-Workshop 1**: AIAA Aviation 2026 (8-12 June, San Diego, CA)
        - Special Session APA-49
            - Session Title: HLPW6 Mini-Workshop I and All-Hands Tagup
            - Date/Room: Thursday, June 11, 3:30-5:30 pm PDT**.** Room Harbor B. Hybrid option available.
        - AIAA AVIATION Early Registration Deadline: Mon, May 11th

- **Test Case 2** – ONERA LRM 2.3 or 2.4: June 2026 to January 2026
    - Focus on laminar-to-turbulent transition on slat and flap lift overprediction
    - **Mini-Workshop 2**: AIAA SciTech 2027 (11-15 Jan, Orlando, FL)

- **Test Case 3** (Tentative) – CRM-HL Take-off Configuration: February 2027 – June 2027
- **HLPW6**: AIAA Aviation 2027 (7-11 June, San Diego, CA)

HLPW6 Website: https://aiaa-hlpw.org/ (Repeat)



SRS TFG subpage is live: https://aiaa-hlpw.org/HLPW6/TFG_SRS

TFG meeting slides posted here, group logistics are up to date

Tecplot & Grids (Repeat)

- Tecplot is offering complementary licenses for the duration of the workshop to participants.
    - Interested parties should make requests specifically to Gibson Adams at g.adams@tecplot.com
- Please contact TFG leadership if you need grids to run on.
    - Standardized guidelines do not exist for committee-provided SRS TFG grids, and differ between HRLES & WMLES
    - You would partner with HeldenMesh/Pointwise grid generation teams to drive the gridding characteristics for these meshes
    - TC1 HRLES Grid now available: https://aiaa-hlpw.org/HLPW6/grids

Participant ID’s (Repeat)

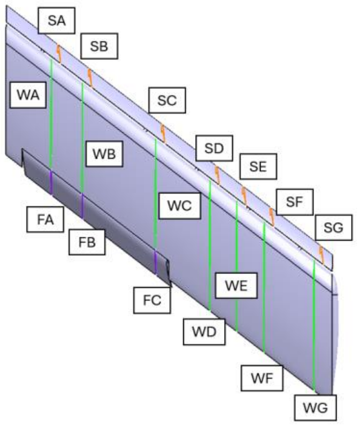
- We are in the process of assigning participant ID’s to individuals/groups who have contacted SRS TFG leadership team
- You should request an ID if you anticipate at least *some level* of active participation
- List not yet live and subject to change

Participant ID	Organization	Solver(s)	Name(s)	TFG(s)
001	University of Kansas	hoMusic	ZJ Wang	S
002	Gulfstream	FUN3D	Andy Clemens, Ed Schurr, Joe Gavin	R, S
003	Gulfstream	Fidelity charLES	Andy Clemens, Ed Schurr, Joe Gavin	S
004	FlexCompute	Flow360	Thomas Fitzgibbon, Mike Park, Qiqi Wang	R, S
005	NASA LaRC & Helden Aerospace	USM3D-ME	Alaa Elmiligui, Andrew Wick, Boris Diskin, Craig Hunter, Mohagna Pandya, Rick Hooker, Sally Viken, Steven Krist, Tausif Jamal	R, S
006	Boeing	Fidelity charLES	Adam Clark, Konrad Goc	S
007	Siemens	Simcenter STAR-CCM+	Chris Nelson	R, S
008	Numeric Systems GmbH	Pacefish	Saad Ali, Eugen Riegel	R, S
009	JAXA	FaSTAR	Andrea Sansica	S
010	National Laboratory of the Rockies (NLR)	Nalu-Wind	Bumseok Lee, Ganesh Vijayakumar, Michael Sprague	R, S
011	Caltech	Fidelity charLES	Imran Hayat, Yuenong Ling, Adrian Lozano-Duran	S
012	ONERA	SoNICS	Younes Bouhafid	S
013	NASA Ames (LAVA Group)	LAVA Cartesian	Michael Barad	S
014	NASA Ames (LAVA Group)	LAVA Unstructured	Emre Sozer	S
015	NASA Ames (LAVA Group)	LAVA Curvilinear	Jeffrey Housman	S
016	NASA LaRC	FUN3D	Nathaniel Hildebrannd, Meelan Choudhari, Prahladh Iyer, Boris Diskin	R
017	Kawasaki Heavy Industries	Cflow	Hidemasa Yasuda, Yuta Sawaki, Hiroyoshi Asano	R
018	Bombardier Aerospace	Dragon	Marc Langlois, Hong Yang	R
019	ONERA, DLR	CODA	Thomas Renaud, Camille Fournis, Fulvio Sartor, Malte Wegener, Axel Schwoeppe	R
020	Polytechnique Montreal	CHAMPS	Baptiste Arnould	R
021	Synopsys Inc.	Fluent	Krishna Zore, Cristhian Aliaga, Jeya Selva, Antil Wakale	R
022	Istanbul Technical University	HEMLAB	Mehmet Sahin, Hulya Sukas	R
023	Barcelona Supercomputing Center	SOD2D	Samuel Gómez González, Oriol Lehmkuhl	S
024	Coventry / De Montfort Universities	OpenFOAM	Mohamed Sereez, Mikhail Goman	R
025	Japan Aerospace Exploration Agency (JAXA)	TAS	Yoimi Kojima, Yasushi Ito, Mitsuhiro Murayama, Takashi Ishida, Kentaro Tanaka, Tohru Hirai	R
026	Embraer	CFD++	Pedro Ciloni, Eduardo Molina, Mauro Lopez, Rodrigo Granzoto	R
027	Embraer	Flow360	Pedro Ciloni, Eduardo Molina, Mauro Lopez, Rodrigo Granzoto	R, S
028	Embraer	Volcano ScaLES	Pedro Ciloni, Eduardo Molina, Mauro Lopez, Rodrigo Granzoto	S
029	Textron Aviation	FUN3D	Kelly Laflin	R
030	INRIA	Wolf	Frederic Alauzet, Cosimo Tarsia Morisco, Matthieu Maunoury	R
031	Simfinity Labs	Unnamed WMLES solver	Nick Hawker	S

TFGs: R = RANS, S = Scale Resolving, H = High-Order, A = AI/ML

Post-Processing Info (Updated)

- Updated TC1 Post Processing information, including two new views, and a single Tecplot layout that captures all post-processing requirements.
  - https://aiaa-hlpw.org/HLPW6/TC1_Post
  - Cp belts also defined
- Final datasets will be submitted to the TFG leadership team via github: https://aiaa-hlpw.org/assets/HLPW6/HLPW6-GitHub-InstructionsRevA.pdf



Test Case 1 Post Processing Information

Data Submittal Forms

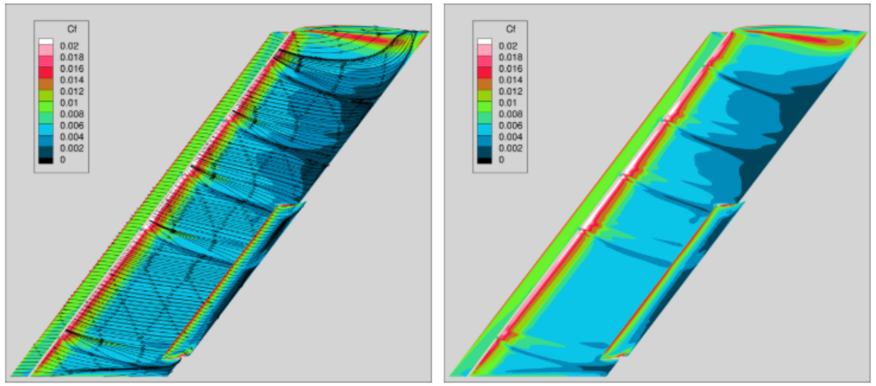
HLPW6 will utilize Github for data submittal. It will be up to the participant to upload their data to the Git Repository.

- HLPW Github Page
- Instructions for Uploading Data
- Detailed Instructions for Preparing Data Submittal Forms

Post Processing: Upper Surface Streamlines and Skin Friction Coefficient (Cf) Contours

Postprocessing: Upper Surface Streamlines and Skin Friction Coefficient (Cf) Contours A major set of desired inputs from the CFD are computed surface streamlines, for qualitative comparison between datasets. This is particularly important for ascertaining the agreement/disagreement with regions of separation and other flow features of interest. Below is an example surface streamline plot, showing typical areas of interest for HLPW-4. There are many methods available for obtaining postprocessed surface streamline patterns; at this time, participants are encouraged to make use of the best tools at their disposal.

Contours of surface skin friction coefficient are also very useful to plot (see second figure immediately below). We are requesting plots of skin friction magnitude (tau_w/freestream dynamic pressure), not plots of its x-component. Note that the definition of tau_w is standard: see, e.g., Wall Shear Stress Definition, with the derivative of the flow velocity parallel to the wall used in the equation. Within the Scale Resolving TFG, both temporally averaged and instantaneous skin friction plots are requested.

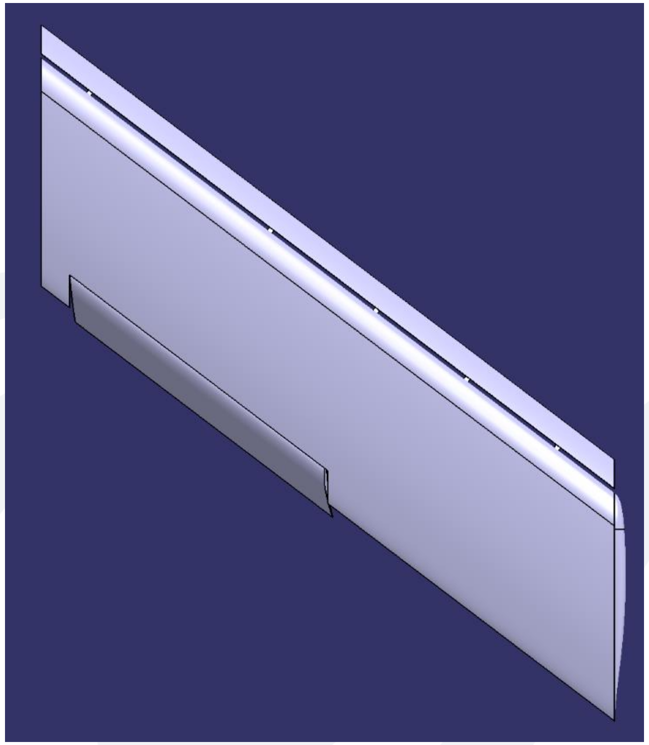


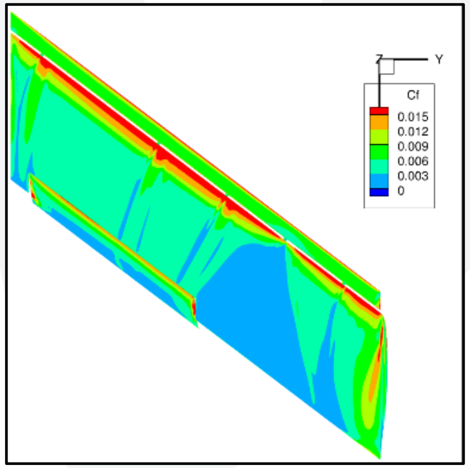
In the second figure, the Tecplot color map is provided as cfmap_tecplot.map, and the table below. The range is 0 to 0.02, step 0.002 (banded). In the Cf plots, the "lighting" should be turned off.

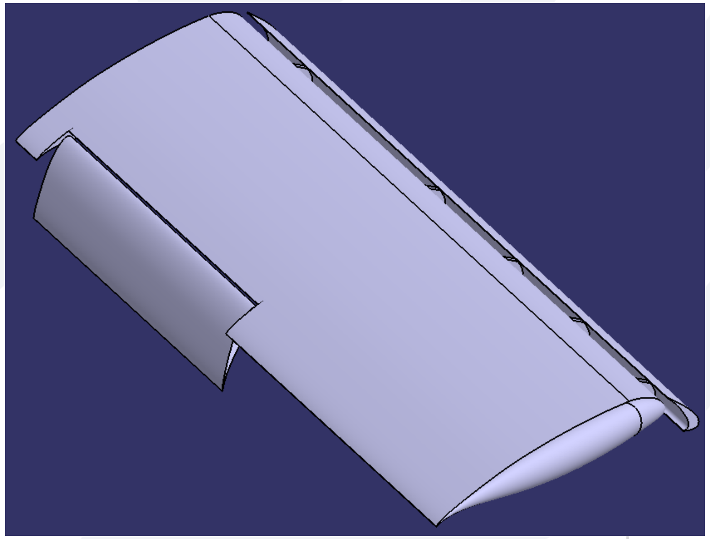
Participant Progress Updates

Test Case 1: CRM-HLS

- Simplified High-Lift configuration, developed with Boeing / University of Washington Collaboration
- Features finite span wing, full span slat, partial span flap
- No experimental data yet, but maybe mid-workshop
- Free air with Y=0 Symmetry, 3.55m ReC
- Built to target slat bracket wake separation on 2nd from outboard bracket
- Many geometric variations possible
    - slat bracket width / depth
    - removable flap
    - removable slat
    - deflection changes, etc.







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Participant Updates

4/21/26

- Univ. of Kansas: Avery & ZJ

Thank You

Key Questions (Repeat)

General Key Questions

1. Are there meaningful distinctions in the predictive accuracy among the various types of scale-resolving methods (e.g. WMLES, DES, LBM)? What are the relative strengths/weaknesses of the methods in predicting aircraft maximum lift and the flow features that drive it (e.g. wing root separation, slat bracket wakes, flap separation)?
2. What is the state of affordability of scale resolving methods for high-lift prediction? Are these methods feasible for routine industrial use on modern compute hardware?
3. Are there certain types of turbulence model choices/frameworks that are needed to systematically improve the accuracy of high-lift flow predictions?
4. What choices regarding grid distribution/topology/density are needed to achieve accurate predictions of high-lift flows? What are the implications for different SRS methods of near-wall grid size (e.g. WMLES/HRLES running at y+ in the log layer)?

Test Case Specific Key Questions

1. TC1 (CRM-HLS, Jan 26-May 26): Can scale-resolving methods be used to provide a high-fidelity reference solution set for the High-Lift CRM Simplified Wing (CRM-HLS) model, including solutions on highly resolved meshes (potentially WRLES/DNS)?
2. TC1/TC2.1 (HLPW5 TC2.3/4, 3-4 AoA's near stall, June 26 – Jan 27): How should scale-resolving methods be handling laminar to turbulent transition, especially on the slat? How can the state of the leading-edge boundary layer predicted by scale-resolving methods be validated to build confidence in the predictions (e.g. using experimental or DNS/WRLES data)?
3. TC2.2 (HLPW5 TC2.3/4, 3 AoA's in linear CL curve range, June 26 – Jan 27): What can be done to improve the accuracy of scale resolving methods at low angles of attack, where inaccurate predictions of flap separation often lead to large mispredictions of aircraft lift?
4. TC3 (likely an ONERA takeoff config, Feb 27 – May 27): Are scale-resolving methods able to reliably predict aircraft drag at low angle of attack?