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# Grids of Participants

## Brief Overview



DPW-6 Participants & Organizing Committee

O. Brodersen



## Other Grids Available

### Structured:

- Embraer, GMA + Ansys ICEM, WB (uploaded)
- CFS Engineering, Ansys ICEM, WBNP (uploaded)

### Unstructured:

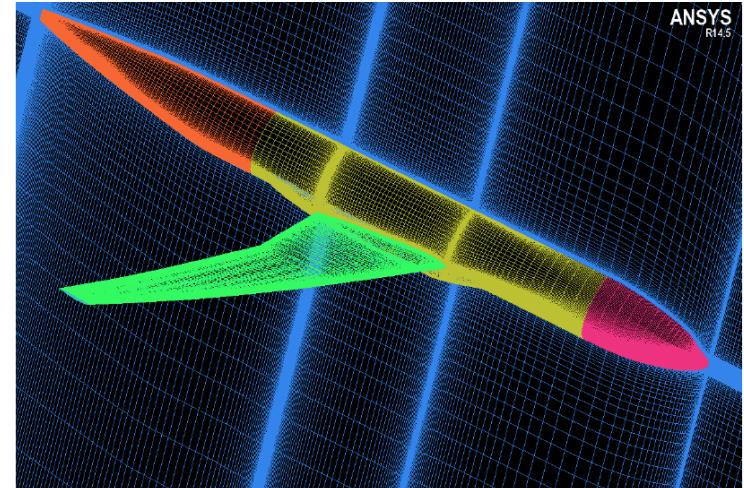
- CARDC Pointwise, WB, WBNP (not completely uploaded yet)
- KHI, WB, WBNP (uploaded but not available yet)
- DLR Solar, WB, WBNP (to be uploaded)
- IISc (uploaded but not available yet)

# 6th CFD Drag Prediction Workshop

## Washington D.C. – June 2016

### Embraer GMA-ICEM Grids

- Structured multiblock (115 blocks)
- WB, Case 2a, Case 3
- Ansys/ICEM,
- Marcello Areal Ferrari, [areal@embraer.com.br](mailto:areal@embraer.com.br)



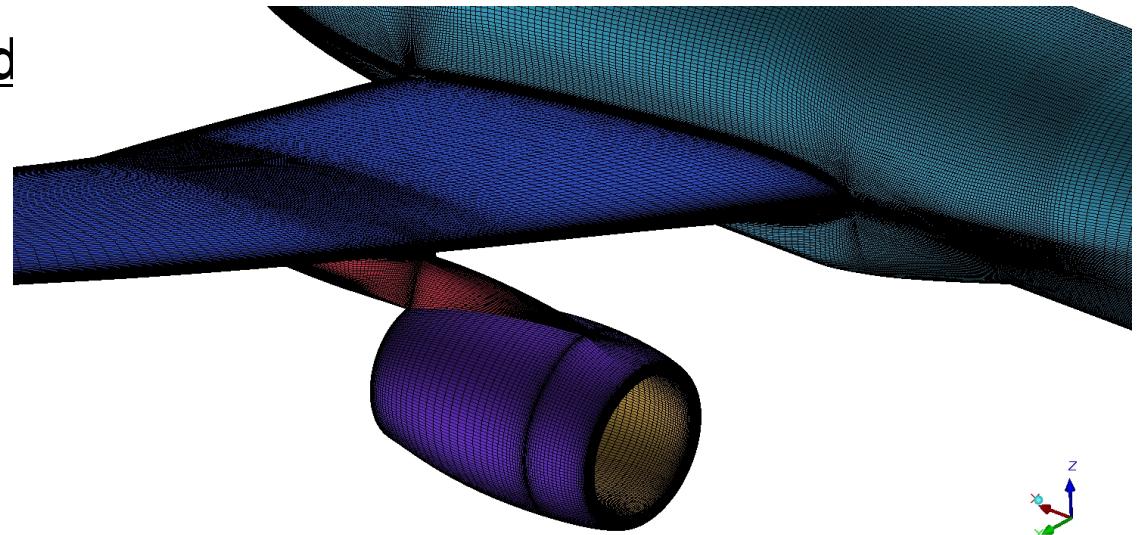
<b>Name</b>	<b>WB</b>		<b>WBNP</b>	
	<b>GG</b>	<b>GMA-ICEM</b>	<b>GG</b>	
Tiny (T)	~20	20.0	25-30	--
Coarse (C)	~30	30.2	40-45	--
Medium (M)	~45	44.9	60-70	--
Fine (F)	~70	69.6	85-100	--
Extra Fine (X)	~100	100.4	130-150	--
Ultra Fine (U)	~150	150.2	190-225	--

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## Washington D.C. – June 2016

### CFS Engineering ICEM Grid

- Structured multiblock (333 blocks)
- WBNP, Case 2b
- Ansys/ICEM, CGNS 3.1 HDF
- dominique.charbonnier@cfse.ch



Name	WB		WBNP	
	GG		GG	ICEM
Tiny (T)	~20	--	25-30	24.8
Coarse (C)	~30	--	40-45	40.0
Medium (M)	~45	--	60-70	62.2
Fine (F)	~70	--	85-100	91.5
Extra Fine (X)	~100	--	130-150	131.8
Ultra Fine (U)	~150	--	190-225	191.8

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### CARDC Pointwise Grids

- Unstructured
- WB, WBNP, Case2a/b
- Pointwise, version 17.1 R4, CGNS 2.54
- best fit for cell centered solvers
- Zhang Yaobing, zhyb\_super@sina.cn

Name	WB		WBNP	
	GG	Pointwise	GG	Pointwise
Tiny (T)	~20	17.7	25-30	22.9
Coarse (C)	~30	26.1	40-45	35.1
Medium (M)	~45	40.3	60-70	54.2
Fine (F)	~70	61.3	85-100	81.4
Extra Fine (X)	~100	--	130-150	--
Ultra Fine (U)	~150	--	190-225	--

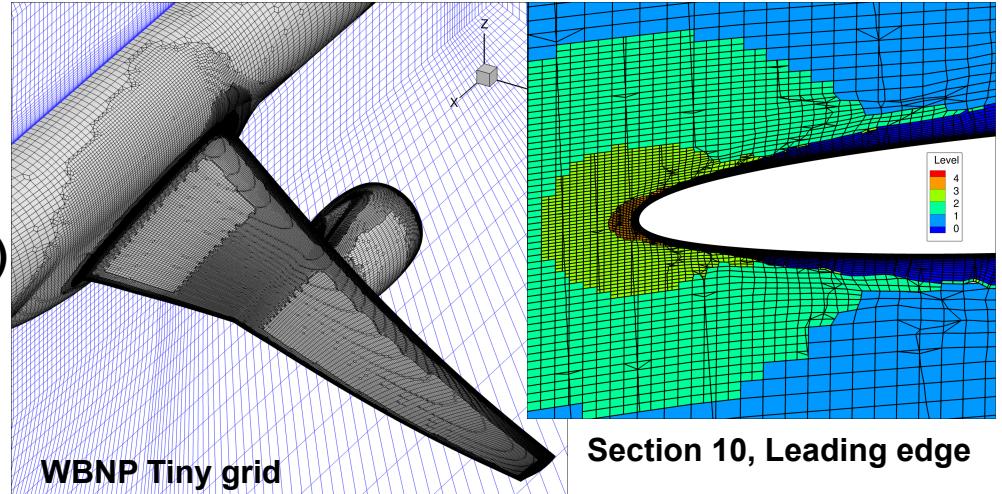
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### KHI Cflow.NOBLU Grids

- Kawasaki in-house CFD tool “Cflow”
- Case 2a/b
- Unstructured hybrid grid (polyhedral cells) with layered grid
- Octree Adaptive Mesh Refinement (AMR)

NOBLU (Non-orthogonal Octree Boundary-fitted Layer Unstructured) Grid



- Taku Nagata, nagata\_tak@khi.co.jp

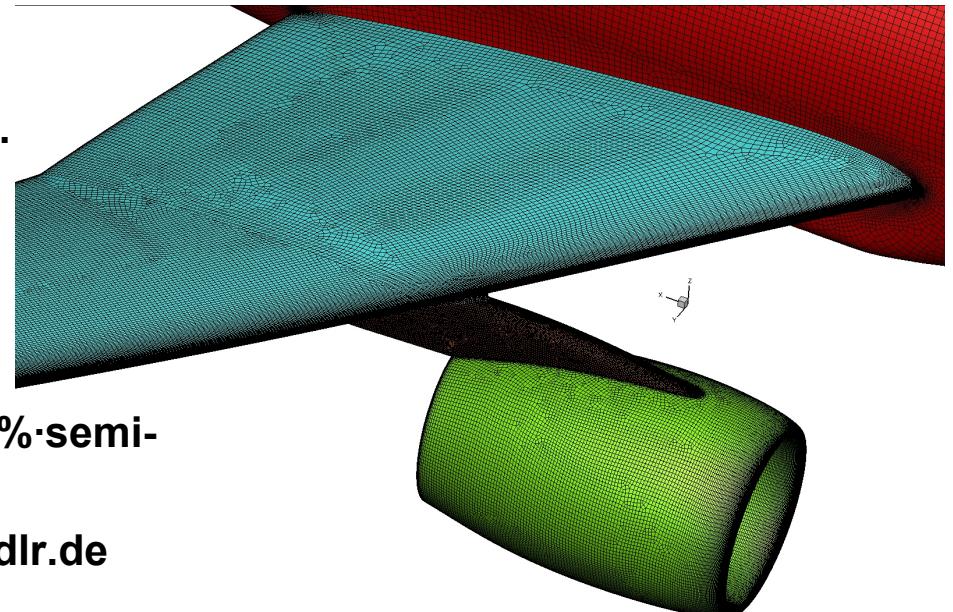
Name	WB		WBNP	
	GG	Cflow	GG	Cflow
Tiny (T)	~20	23.7	25-30	32.2
Coarse (C)	~30	34.2	40-45	46.9
Medium (M)	~45	50.1	60-70	68.1
Fine (F)	~70	75.3	85-100	101.1
Extra Fine (X)	~100	110.4	130-150	147.2
Ultra Fine (U)	~150	162.0	190-225	213.6

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### DLR Solar Grids

- Started Grid Generation from WBNP, Fine (F).
- Derived coarser grids through scaling of sources, Factor  $1/1.5^{1/3} = 0.873\dots$
- Wing & Nacelle TE base  $\gg 8$  Cells reduced to 2 (INB) to 7 (OTB).
- Wing spanwise spacing increased from  $< 0.1\%$ ·semi-span at root/engine to  $\sim 0.34\%$ .
- S. Keye, S. Melber-Wilkending, [stefan.keye@dlr.de](mailto:stefan.keye@dlr.de)



Name	WB (pts)		WBNP (pts)		$\Delta y_1 / [\text{in}]$
	GG	SOLAR	GG	SOLAR	
Tiny (T)	~20	7.15	25-30	11.8	0.001478
Coarse (C)	~30	14.1	40-45	23.2	0.001285
Medium (M)	~45	26.8	60-70	44.9	0.001118
Fine (F)	~70	39.7	85-100	81.1	0.000972
Extra Fine (X)	~100	--	130-150	--	0.000845
Ultra Fine (U)	~150	--	190-225	--	0.000735



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### IISc Grids

- xxx
- N. Balakrishnan, [nbalak@aero.iisc.ernet.in](mailto:nbalak@aero.iisc.ernet.in)

<b>Name</b>	<b>WB</b>		<b>WBNP</b>	
	<b>GG</b>		<b>GG</b>	
Tiny (T)	~20		25-30	
Coarse (C)	~30		40-45	
Medium (M)	~45		60-70	
Fine (F)	~70		85-100	
Extra Fine (X)	~100		130-150	
Ultra Fine (U)	~150		190-225	



Applied Aerodynamics  
Technical Committee

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**Please provide your grids**