

Speeding up the CFD Process

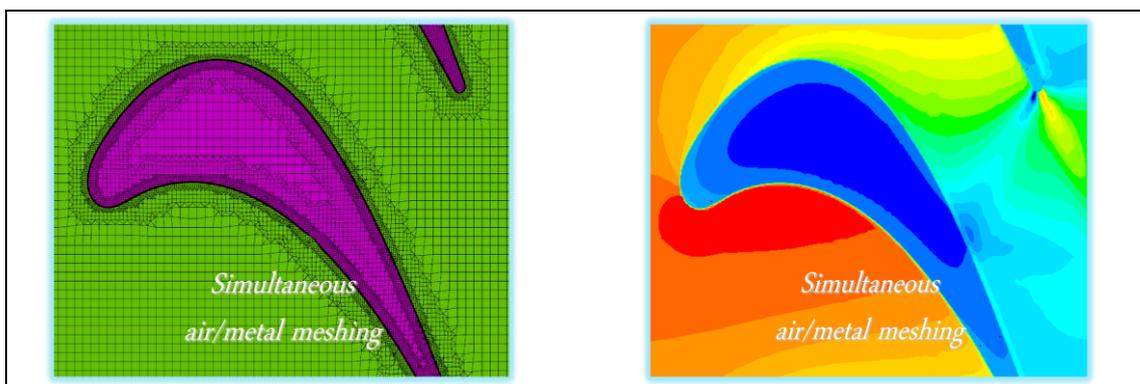
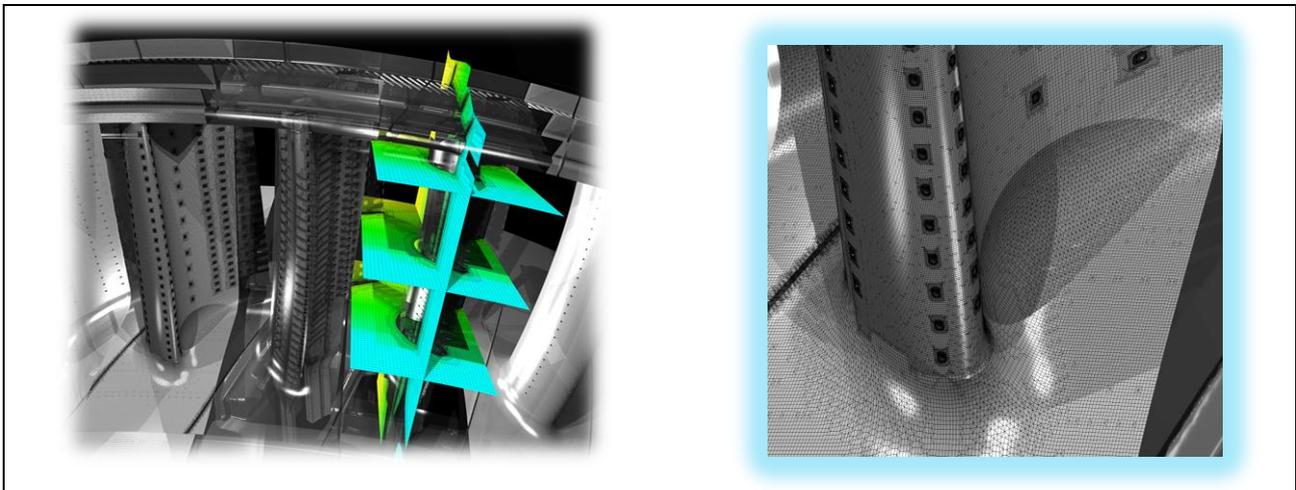
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Over recent years we have conducted research focussed on the CFD Process – an integrated process chain encompassing computational geometry, mesh generation, flow solving and post-processing. Our aims have been to overcome bottlenecks, enable automation - for design optimisation - and effect a dramatic speed up. We have been motivated by the challenge of dealing routinely with the most complex geometries – exemplified in turbomachinery by cooled gas turbine blades and their associated secondary air system.

For mesh generation we have developed a system called BoXeR based on hybridising a background octree mesh into body-fitted form – with viscous layers. BoXeR generates solver-ready meshes – robustly and automatically - for essentially arbitrary geometries in tens of minutes on modest cpu clusters.

For flow solving we have extended our standard RANS flow solver, NEWT, to run on fully hybrid meshes and then ported it to GPUs – graphics card architectures. This speeds up flow simulation by about an order of magnitude – to keep pace with the speed up in mesh generation.

This presentation will summarise these developments and then show some examples drawn from our work in turbomachinery.



Biography of Carlos Felipe Favaretto

Place of Birth : Porto Alegre, Brazil

Education

- Bachelors Degree in Mechanical Engineering (1993 - 1998)
Federal University of Rio Grande do Sul, Porto Alegre, Brazil
- Masters Degree in Engineering (1998 - 2000)
Federal University of Rio Grande do Sul, Porto Alegre, Brazil
- Doctoral Degree in Mechanical Engineering (2001 - 2004)
Iwate University

Professional Career

- Toshiba Corporation (2004 - 2005), Yokohama
Mechanical Engineer
- Cambridge Flow Solutions (2005 - 2008), Cambridge, UK
Research Engineer
- Siemens Industrial Turbomachinery (2008 - 2011), Lincoln, UK
Principal Aerodynamicist
- Cambridge Flow Solutions (2011), Cambridge, UK
Senior Development Engineer
- BoXeR Solutions (From April 2011), Kobe
Representative Director