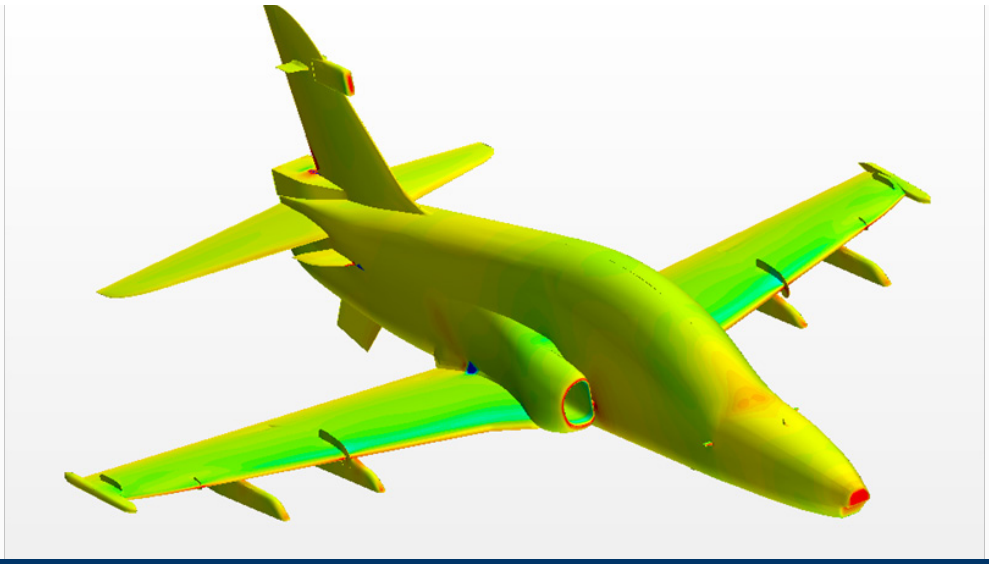
Focus on CSIR services in

the computation of fluid interactions

As a component of the CSIR's work in Aeronautic Systems, this group uses specialist commercial and customised computational codes to solve complex aerodynamic, fluid-dynamic, fluid-structure and multi-physics problems addressing needs ranging from those of Airbus and defence contractors, local industry and mining to the supply of adequate ventilation to individual patients in the hospitals of the future.



Transonic aircraft aerodynamics

Research areas

- Application Areas
  - Store integration and transonic flows
  - Industrial flows
  - Coastal defences
  - Ventilation analysis
  - Space sciences and launchers
  - Free surface/2-phase flow analysis
  - Molten metal flows
- Custom Computational Fluid Dynamic (CFD) code development
  - Naval engineering; wave modelling
  - Process engineering
  - Liquid-gas tank sloshing
  - Casting, smelting
  - Microfluidics

Capabilities

- Computational clusters running a variety of commercial and in-house analysis codes
  - Star CCM+, Numeca, Ansys Fluent, ESI CFD Fastran
  - Edge, OpenFOAM
  - Integrated CAD, Meshing and Analysis capability
- Engineering Solutions
  - Integrated Wind Tunnel/ Experimental Fluid Dynamics and CFD offering
  - Broad range of experience in aerospace and industrial applications using commercial and in-house developed codes

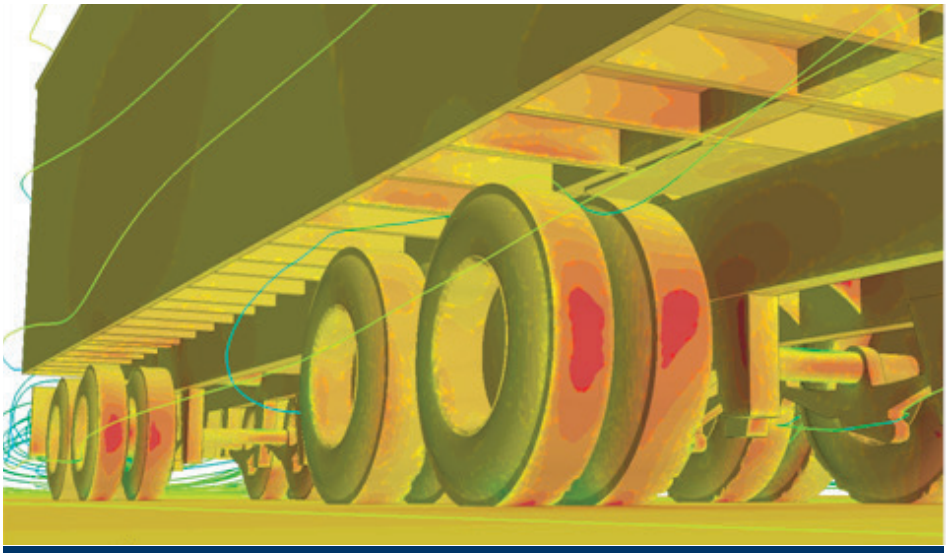
CSIR

our future through science

- Custom CFD code development
  - Development of customized solvers and libraries within the OpenFOAM toolset
  - Programming and scripting for automation – C++, Octave/Matlab, Python, Bash
  - Research in numerical algorithm design and high performance computing
  - Expertise in multiphase and multiphysics CFD simulation

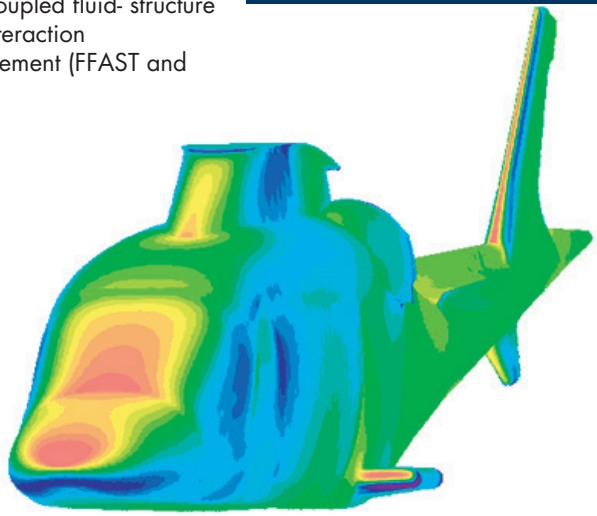
R&D track record

- Store carriage and clearance
- Modelling of SAAF aircraft including Hawk, Cheetah, Rooivalk, A109 and Oryx
- Aeroelastic models
- Booster separation
- Ventilation simulations
- Mining and Metals industrial solutions
- Analysis of moving bodies, eg Coastal defences
- In-house capabilities include:
  - Multiphysics liquid-gas modelling
  - Dynamic sloshing
  - Compressible and incompressible flows
  - Non-isothermal multiphase flow
  - Coupled fluid- structure interaction
- EU FP7 involvement (FFAST and NOVEMOR)



Vehicle Aerodynamics

Coastal defence multiphysics problems



Helicopter Aerodynamics

Contact details:

Dr Glen Snedden
Aeronautic Systems
dpps@csir.co.za