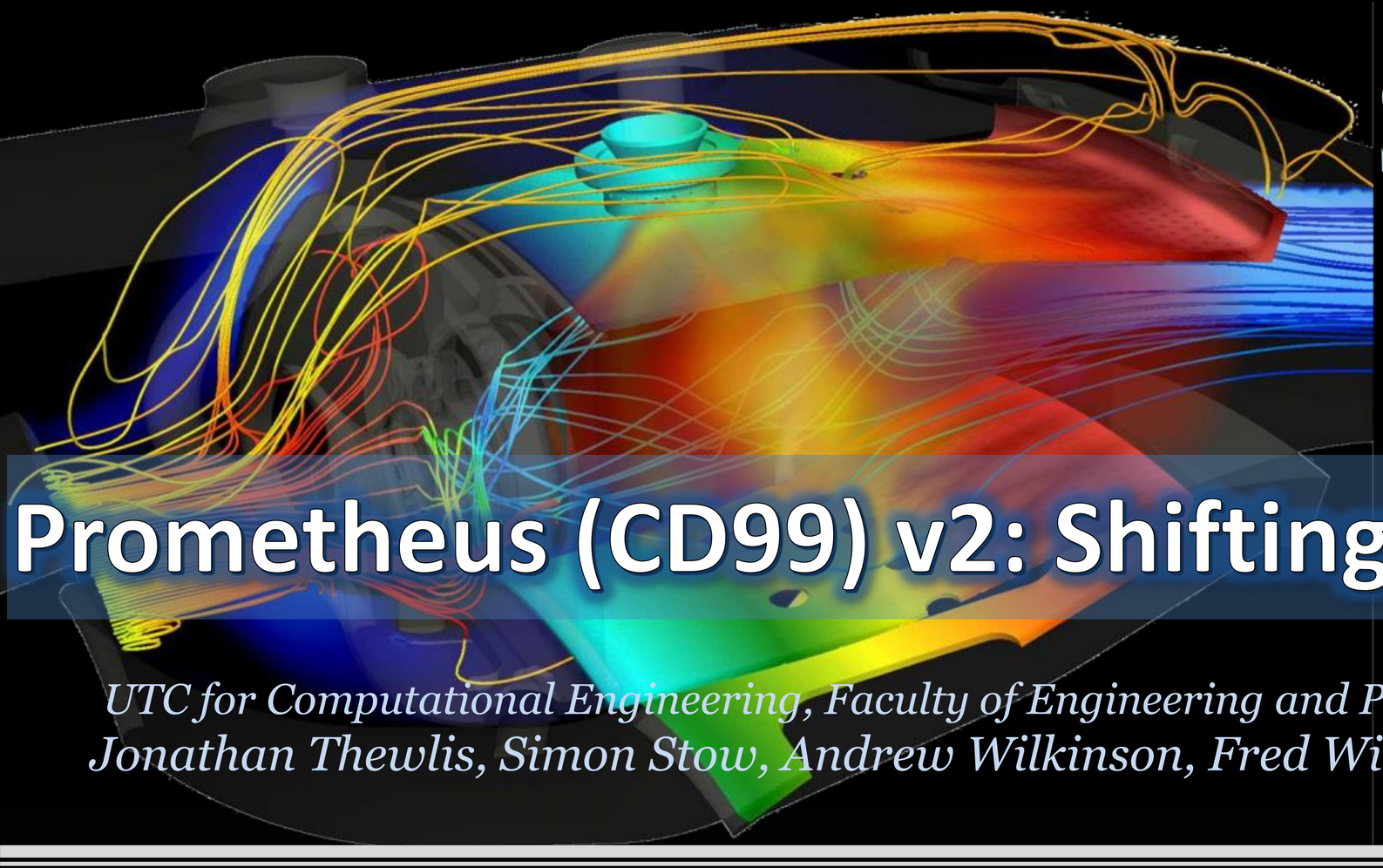

UNIVERSITY OF Southampton

Engineering and the Environment

Aeronautics, Astronautics and Computational Engineering

Prometheus (CD99) v2: Shifting Flexibility to Users

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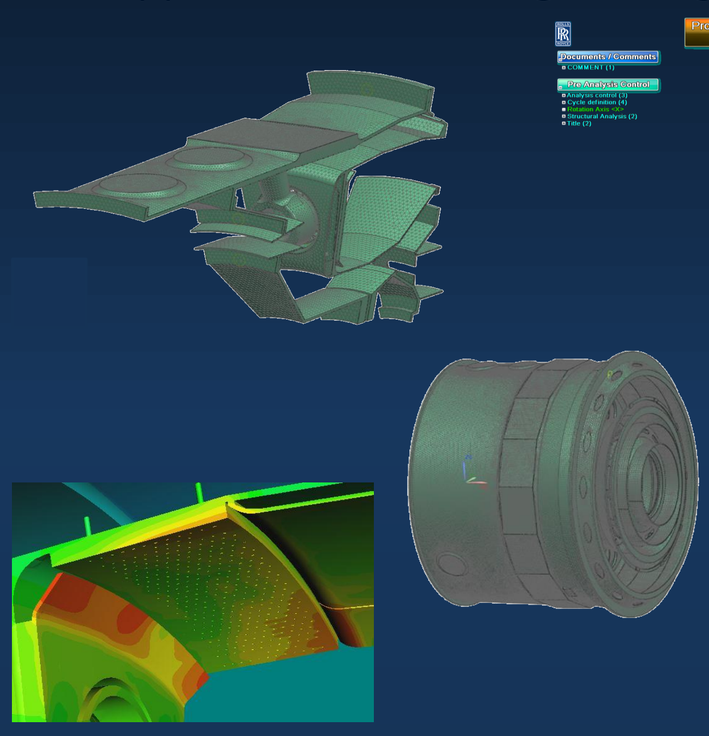
What is Prometheus?

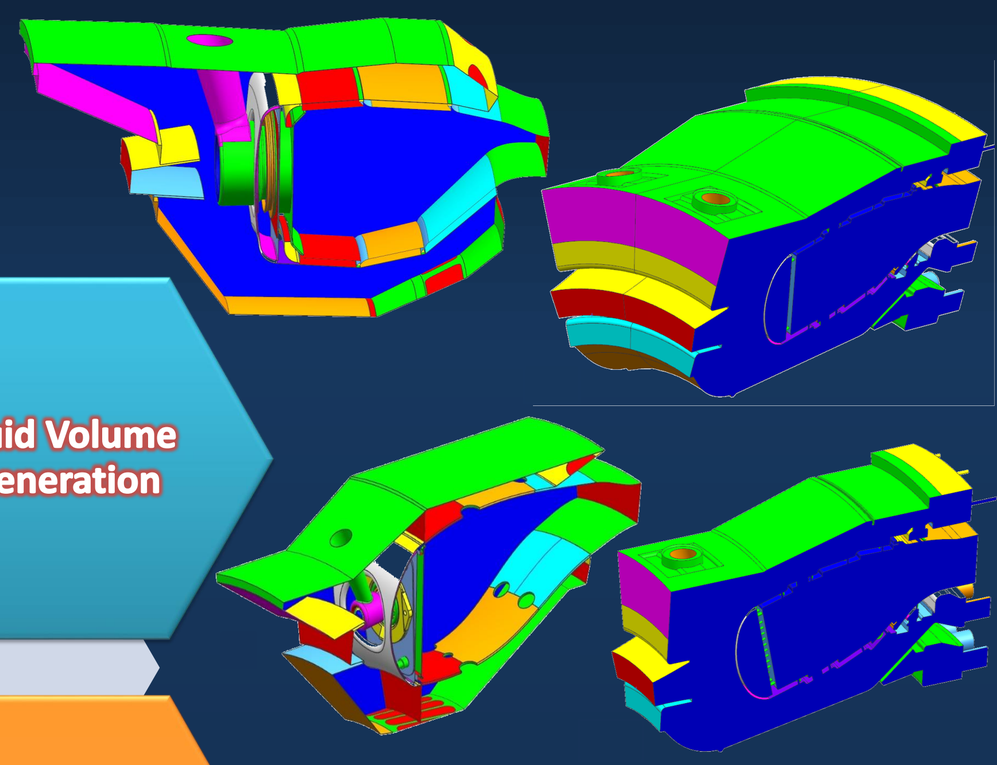
Prometheus, officially known as **CD99**, aims to develop an efficient and effective multi-disciplinary combustor design system, which facilitates complex geometry changes while automatically pre-processing geometry and generating the required scripts for a variety of operations using embedded engineering knowledge and best practice. As a continuously evolving design optimisation platform, Prometheus has now been applied to a wide range of engine components.



Examples of generated FEA models (above) and Mesh & CFD results (below)

Prometheus Capabilities

Special emphasis is given to the application of the Siemens NXOpen C/C++ Application Programming Interface (API) to efficiently automate various stages of the optimisation loop, including geometry generation, modification, identification, aero-thermal network generation, mesh & CFD preparation, and FEA analysis. Developed using an object-oriented approach, Prometheus uses a series of feature based geometry recognition routines to allow geometry changes to be automatically reflected in any generated scripts.



Examples of generated fluid volume (above) and Flownet networks (below)

What's New in Prometheus v2?

The latest version of Prometheus, also known as Prometheus v2, shifts flexibility to users by exposing more internal rules and best practice. It means users can define their own rules and parameters for various operations using the new exposed XML commands. By comparing to previous versions, users now take controls over each step more easily. Besides running Prometheus fully-automatic from CAD geometry to meshing and CFD script generations, significant topological changes can be easily dealt with by using the combinations of built-in and user-defined rules without touching the code. This approach has been used in the recent integration of afterburner geometry into Prometheus.

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