ANSYS CFD has been a key mesh generator in our work places since 2000. It was used for the combustor design project because its structured hexa mesher offers unique features with all the required capability and flexibility. Also ANSYS CFD has a good interface with Unigraphics (UG) and the mesh generation process can be easily scripted.

We have established an excellent relationship with the ANSYS technical staff, who we think are very knowledgeable and have always been prompt in providing technical support to us.

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GE Aircraft Engines
The design of an aircraft engine combustor is a multidisciplinary process involving aero CFD, combustion, heat transfer CFD, dynamics, thermal, mechanical and life prediction. In order to meet aggressive new product introduction (NPI) analysis requirements, GE Global Research Center has been collaborating with GE Aircraft Engines to develop advanced combustor design technologies. In particular, a multidisciplinary design optimization has been conducted for an aircraft engine combustor structure. In addition to several enabling technologies, automated meshing strategies using ANSYS CFD hexa were developed and high quality all-hex meshes were generated for a full combustor sector model.

Business Challenges
Mesh generation plays a critical role in an automated design process. Not only does the mesh quality have a significant effect on the analysis accuracy, but the meshing procedures also must be scriptable, without human intervention. Meshing strategies need to be developed to generate high-quality meshes in an automatic fashion. In this work, an all-hex mesh was required for the full combustor sector model to ensure analysis accuracy.

Technology Used
ANSYS® CFD

Engineering Solution
The full combustor sector model was divided into three main components: innerliner, outerliner and dome-assembly. Each component was further divided into a set of subcomponents:
- Generate tetin files using prt2tetin script
- Generate replay files in hexa
- Integrate meshes into a component or full-combustor model
This generated an all-hex mesh for the full combustor sector model.

Benefits
- Streamlined interface with Unigraphics for easy accurate geometry translation
- Novel and unique blocking strategies for high-quality meshes
- Great capabilities for pure hexahedral, pure tetrahedral and hybrid meshes
- Excellent scripting features for automated mesh generation
- Wide options of analysis codes for mesh export
- Knowledgeable and friendly personnel for prompt technical support