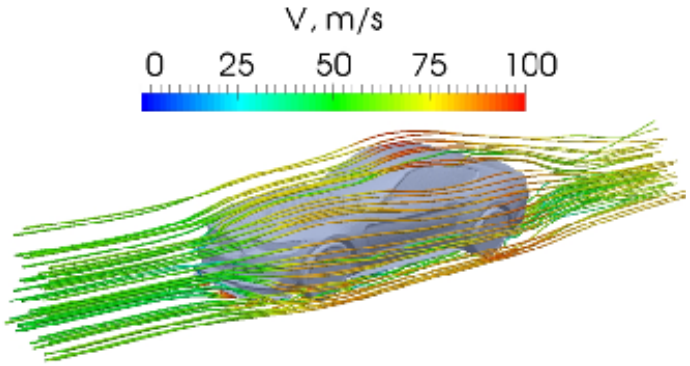
RIGHT-SIZE DIMPLE EVALUATOR v. 2.0

Technology Readiness Level: 5
Key elements demonstrated in relevant environments

There are many examples of surface modifications that reduce resistance to flow and improve performance. For instance, a dimpled golf ball can travel twice as far as a smooth ball when hit with the same force. Dimple modifications have had an impact on many application fields, most recently vehicles, aerospace, and energy systems. However, there is no methodology or tool to ensure optimal dimpling. Sandia Labs has developed a software that predicts optimal dimpling for any turbulent system for reduced flow drag.

Sandia's Right-Size Dimple Evaluator uses a unique set of independent turbulence equations, with input based on the system's specific characteristics. The software can also import fluid properties from the REFPROP NIST database.

The software uses the input to calculate an optimal dimpled pattern for the intended application—thereby eliminating guesswork or design by trial and error. The software ensures the dimple dimensions enable unimpeded flow through the dimple's concave cavity. This software will enable a wider range of applications to apply dimple modifications to enhance performance.



Simulation of an optimally dimpled Ford Mustang

TECHNICAL BENEFITS

- Optimal dimple spacing and size for reduced resistance to flow
- Increased heat-transfer rate at surfaces for higher thermal efficiency
- Script runs on Matlab but can be easily programmed in C++ and FORTRAN
- Designed to run on a PC
- Can import fluid density and viscosity values from REFROP NIST

INDUSTRIES & APPLICATIONS

- Any system with turbulent flow
- Aerospace
- Vehicle design
- Microfluidics
- Solar, Wind, and Nuclear Energy
- Turbines
- Heat exchangers
- Ships

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