



ARGONNE'S VERIFI PROGRAM HELPING IMPROVE ENGINE DESIGN WHILE REDUCING DEVELOPMENT TIME AND COST

Argonne's Virtual Engine Research Institute and Fuels Initiative, or VERIFI, offers an unparalleled approach to virtual engine design.

THE CHALLENGE

Engine manufacturers are always looking for ways to more efficiently produce engines that have better fuel economy, are more reliable, and last longer. However, that process is complex, expensive and takes a significant amount of time.

Creating physical engine prototypes is particularly costly and time-consuming. Materials, energy consumption, and the labor associated with building a physical prototype are all factors that make that approach challenging.

Given the challenges associated with traditional engine design, some manufacturers employ engine models and computer simulations that provide — in virtual space, before costly physical production ever begins — a more efficient and cost-effective way to design engines.

However, while virtual engine design offers advantages over physical prototypes, challenges

still remain, as simulations are often unreliable because they frequently cannot account for uncertainties and thus cannot provide accurate, dependable results.

THE INNOVATION

Researchers at the U.S. Department of Energy's Argonne National Laboratory have developed the Virtual Engine Research Institute and Fuels Initiative (VERIFI).

VERIFI is the first and only source in the world for high-fidelity, three-dimensional, end-to-end combustion engine simulation/visualization and simultaneous powertrain and fuel simulation, with uncertainty analysis.

VERIFI is supported by a multidisciplinary team of experts who work in high-performance computing, fuel chemistry, combustion science and engine performance. These experts leverage some of the world's fastest supercomputers, most diverse engine labs, and ultra-

bright X-ray beams to provide a better understanding of how engine parameters interact, thus reducing the uncertainty that is often associated with engine simulations.

THE IMPACT

VERIFI helps Argonne's partners:

- Significantly reduce the number of experimental test campaigns
- Shrink engine development timescales
- Significantly lower the cost of engine development
- Solve their most complex engine questions
- Seize opportunities in the market

CONTACT

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