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Simulation Tools in Aerospace Applications

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Learning Objectives

- Learn how to identify new applications of simulation tools in your work
- Learn how to better judge precision of simulations in demanding applications
- Learn how to use best practices in setting up and running large-scale CFD and mechanical simulation in aerospace and other applications
- Be inspired about the future of space exploration and

Description

Simulation tools are transforming the field of aerospace design by enabling affordable, on-demand simulation capabilities. Escape Dynamics, Inc., has been actively using mechanical and computational fluid dynamics (CFD) simulation tools in the design/optimization process of several key components of their space launch system, including antennas for wireless energy transfer, airframe and structural components of a single-state-to-orbit space plane, and a highly efficient combustion-free engine configured to use wireless microwave energy to power a space plane. In this lecture we will summarize the key benefits of using Simulation software tools in aerospace design application, and we'll focus more narrowly on the CFD and mechanical simulations of our thermal thruster engine. We will specifically focus on comparison between simulation results and the real-world test data and share the lessons we've learned in simulating various heat-exchanger topologies, flow-through nozzles and pipes, and flow-with-heat addition.

Presenter Bio

Dr. Dmitriy Tseliakhovich is the CEO and CTO of Escape Dynamics, an aerospace research and development company focused on highly efficient space launch and aerospace propulsion systems. Dmitriy is leading the research effort on advanced electromagnetically powered space launch engines, wireless energy transfer, high-power microwave systems, and high-temperature materials. Dmitriy has a PhD in astrophysics from California Institute of Technology and an MSc in physics from Carleton University in Ottawa, Canada. Dmitriy is also a graduate of Singularity University. Dmitriy has more than 10 years of research experience in physics, astrophysics, and space engineering. His research career includes extended work on the physics of dark matter and cosmological inflation at the Space Telescope Science Institute. His technical expertise includes theoretical/experimental physics, large numerical simulations, and wireless energy and novel propulsion systems.