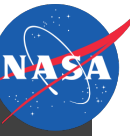




Passive particles seeded at the trailing edge of quadcopter rotors in LBM simulation

**NASA Advanced Supercomputing Division**  
NASA Ames Research Center

POC: Cetin Kiris ([cetin.c.kiris@nasa.gov](mailto:cetin.c.kiris@nasa.gov))



**NASA Advanced  
Supercomputing Division  
(NAS)**

at

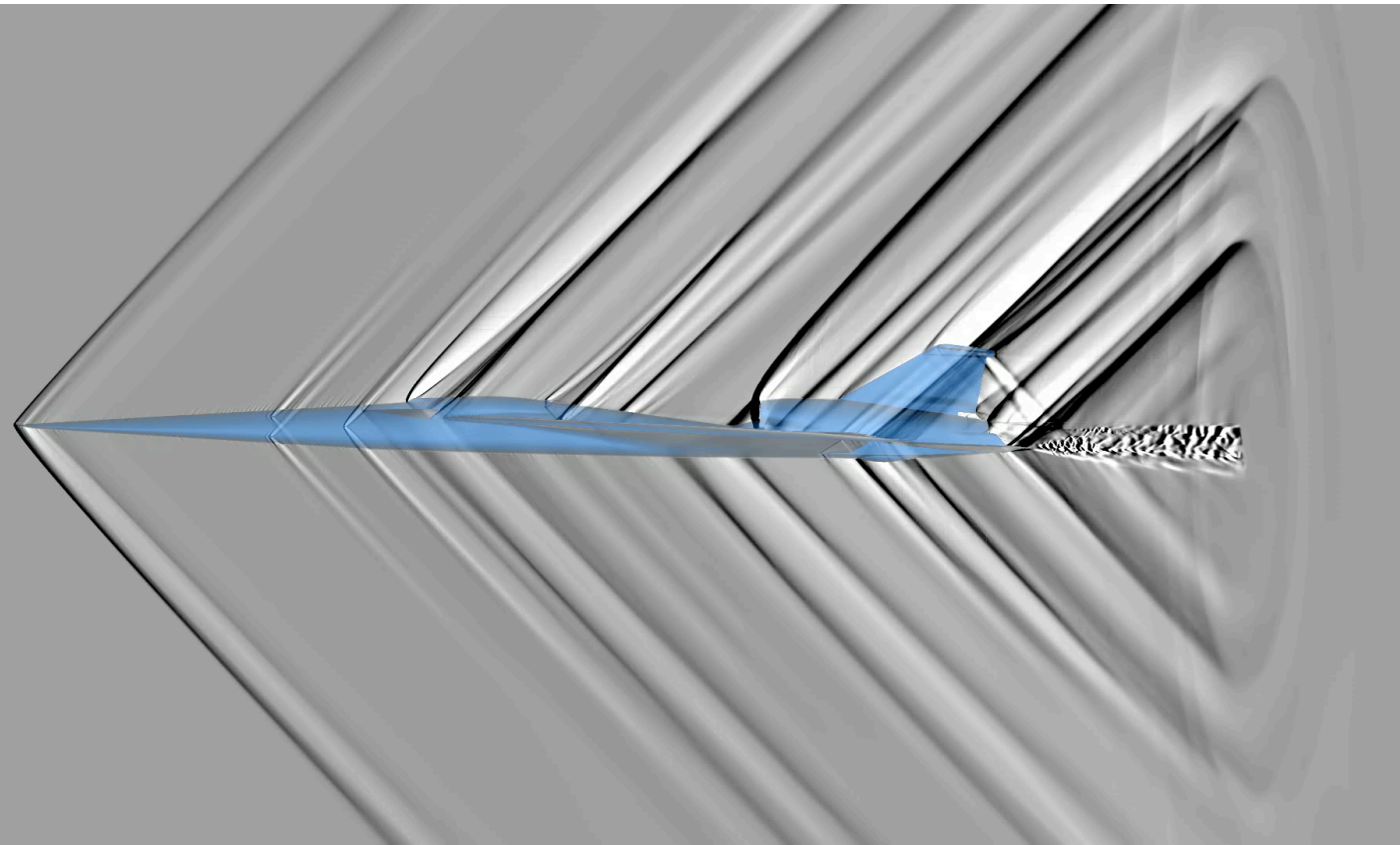
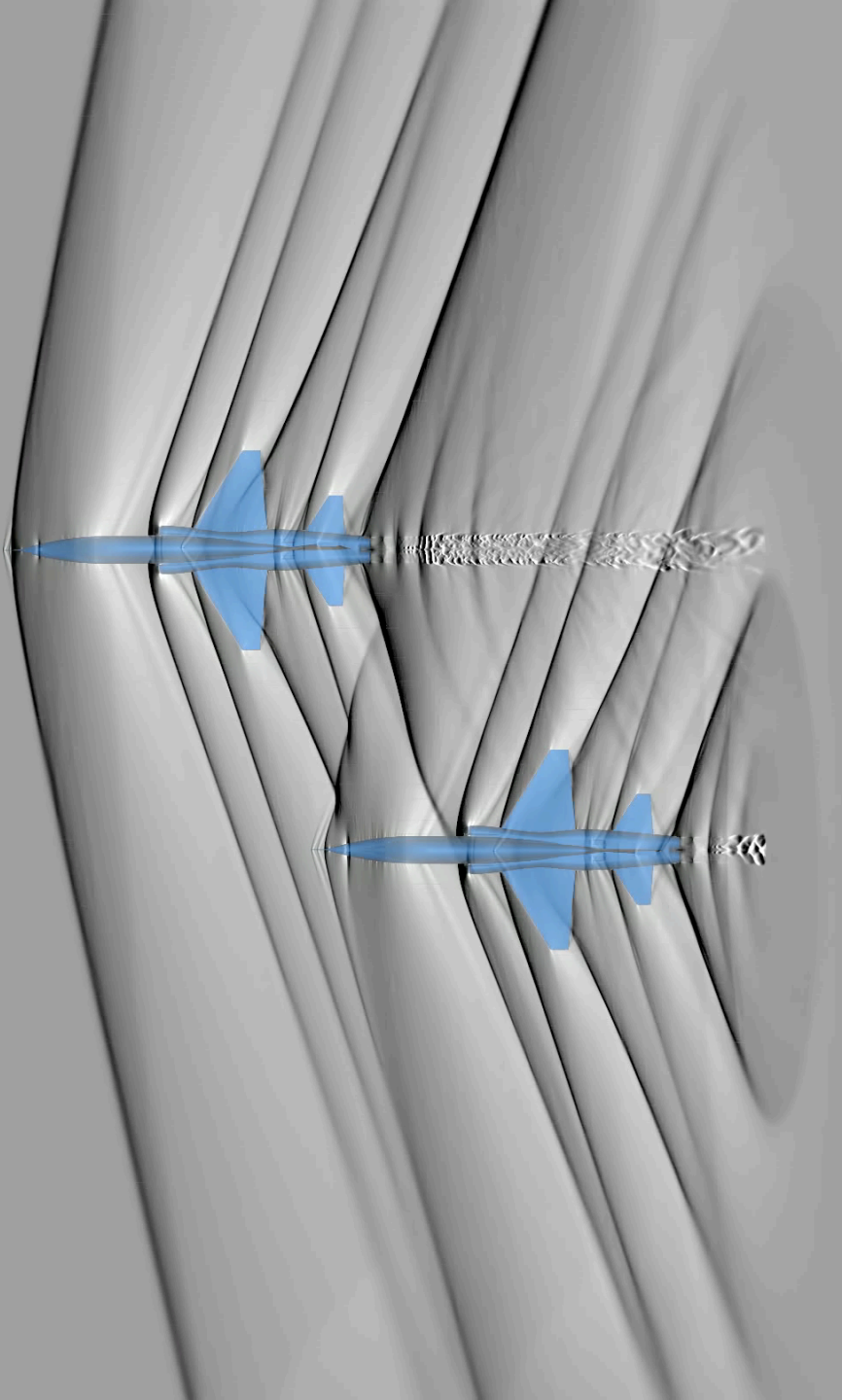
**GoFly**

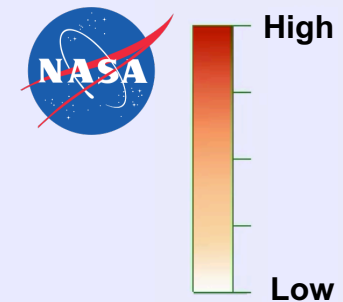
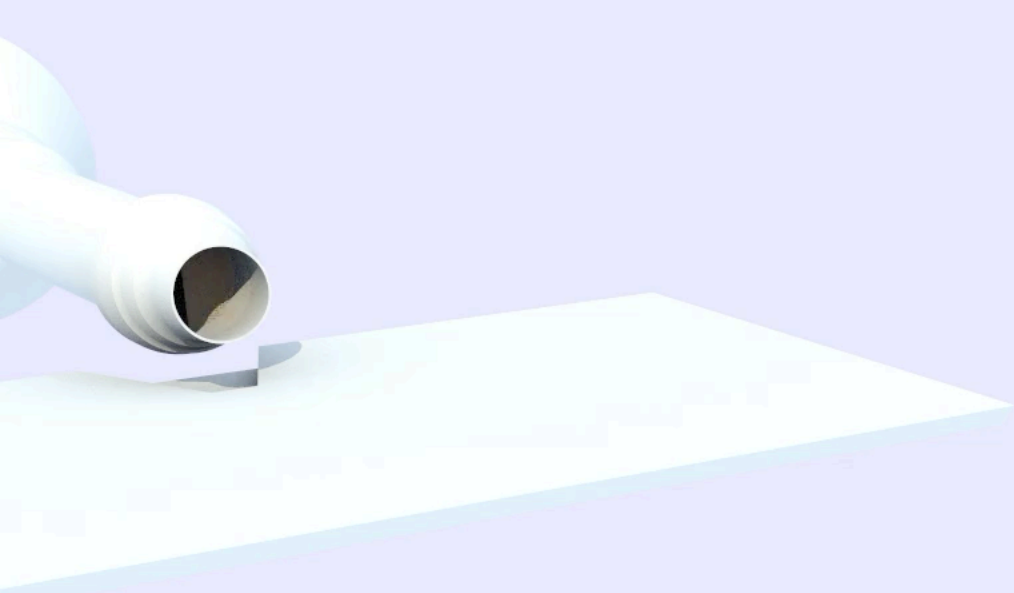
**Moffett Field, CA**

**Saturday, Feb. 29<sup>th</sup> 2020**

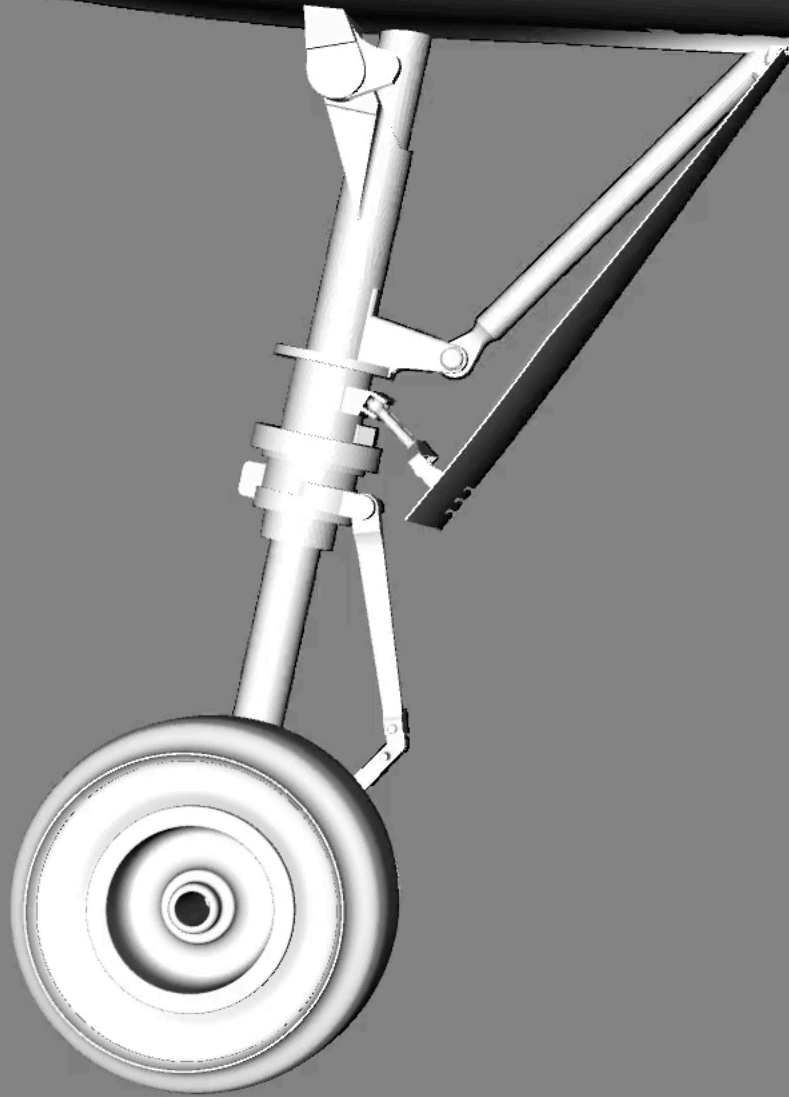
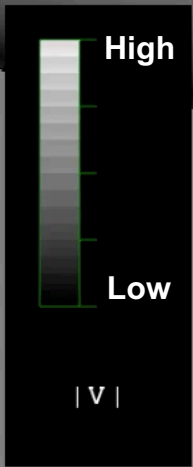
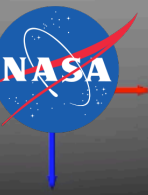
*Jonathan Boustani*

Schlieren visualizations from simulations of two T-38s flying in formation (left) and the X-59 (bottom) from Cart3D.





Passive particles seeded inside the nozzle of a round jet interacting with a flat plate. Particles are colored by velocity magnitude where red is high, and white is low. *Video Credit: Tim Sandstrom*



Color contours of velocity magnitude over a BANC3-workshop, partially-dressed landing gear. Simulated using the Lattice-Boltzmann Method with the EMRT collision model.



Steady-state RANS simulations for LAVA support of the X-57 database. The flow field is colored by velocity contours (left) and Mach number (bottom). The aircraft is colored by pressure coefficient.

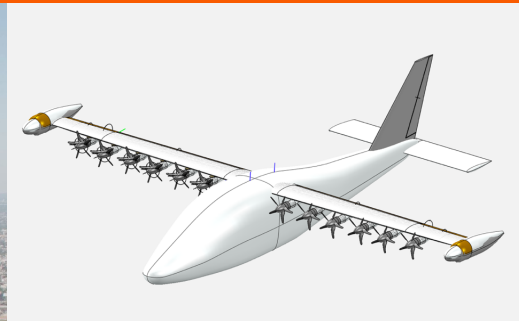
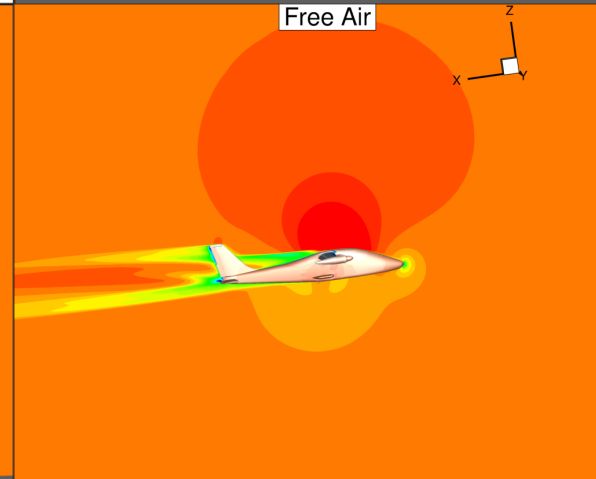
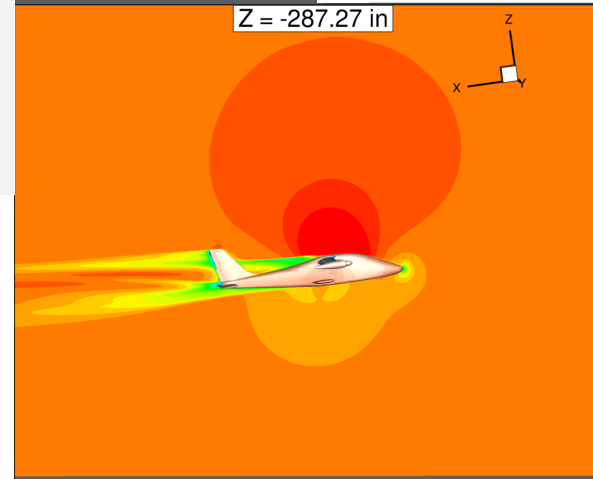
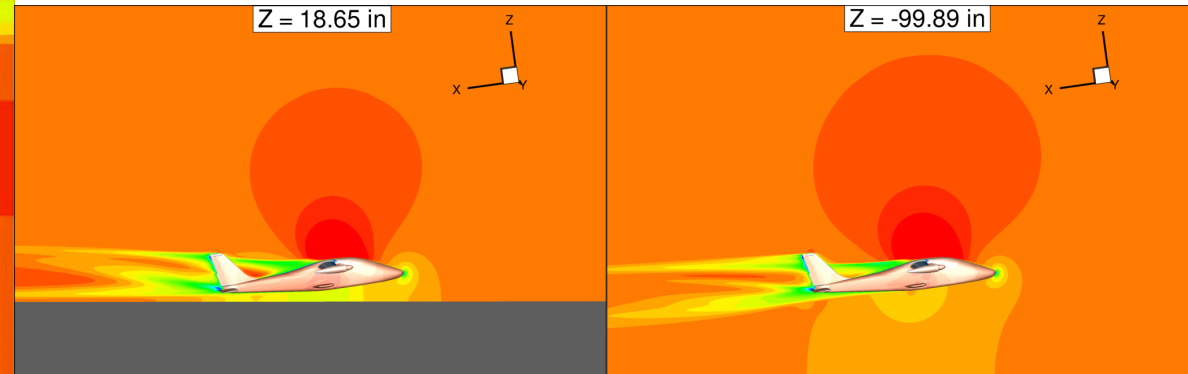
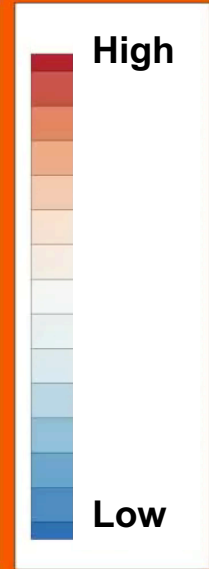
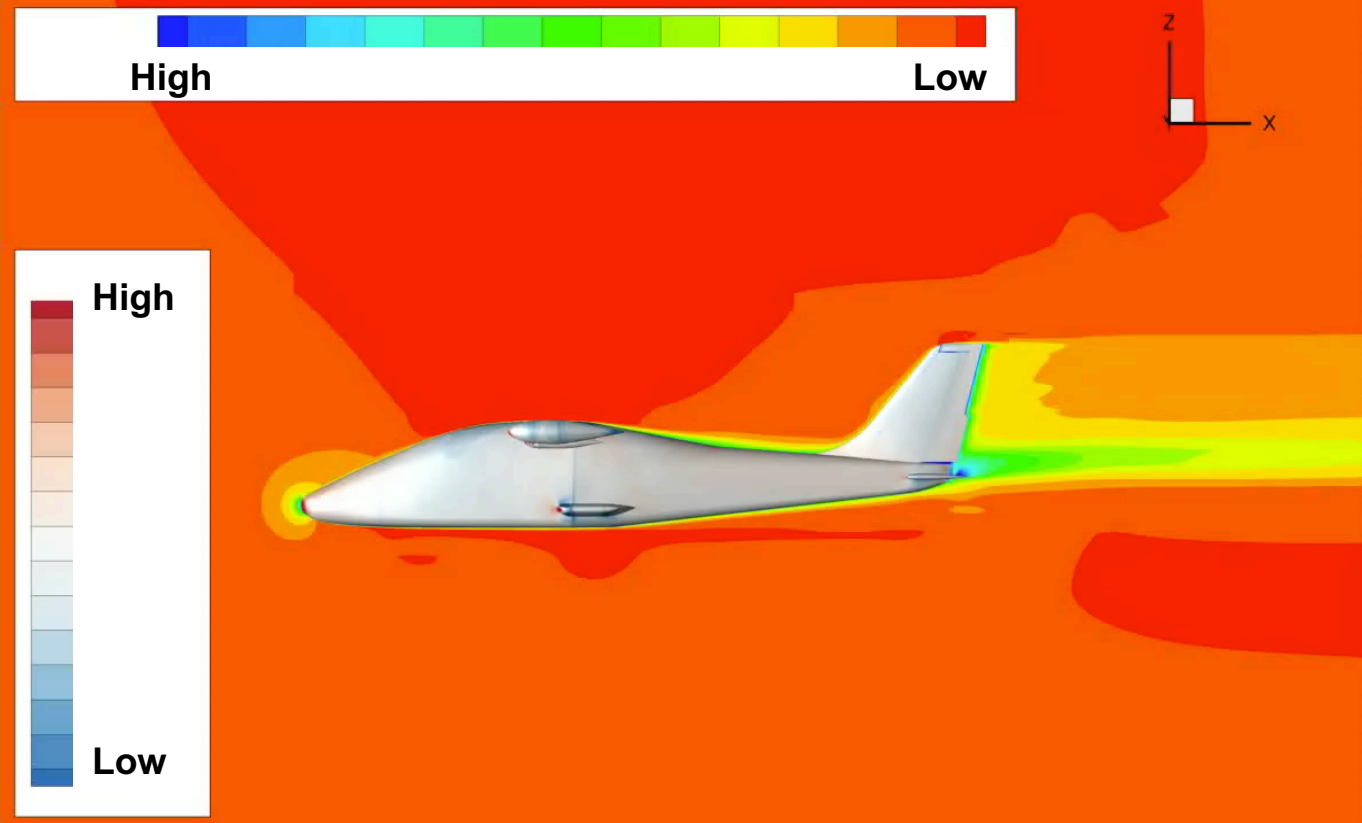
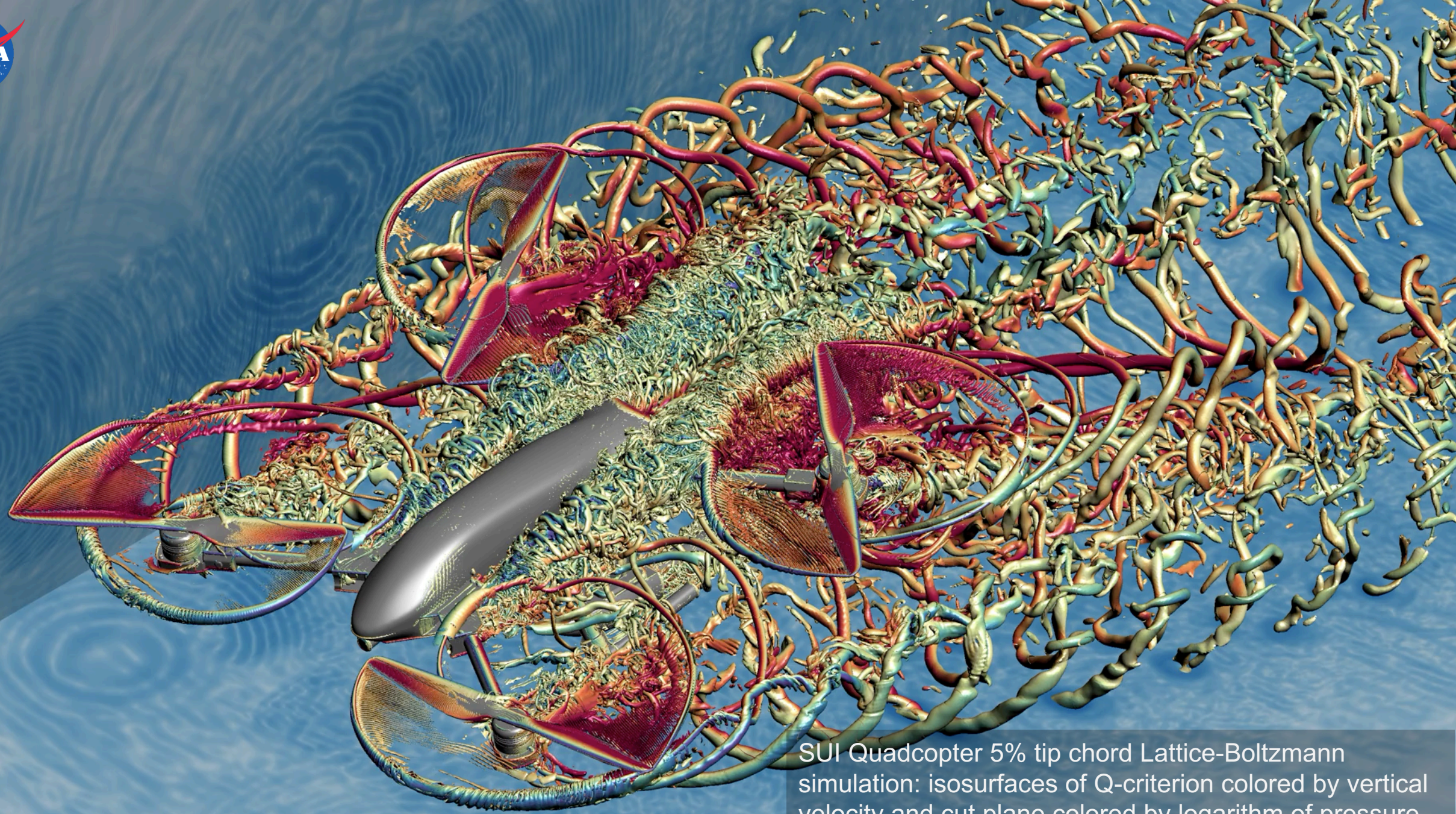
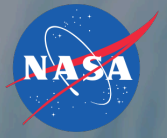
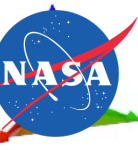


Image source:  
<https://www.nasa.gov/centers/armstrong/news/FactSheets/FS-109.html>



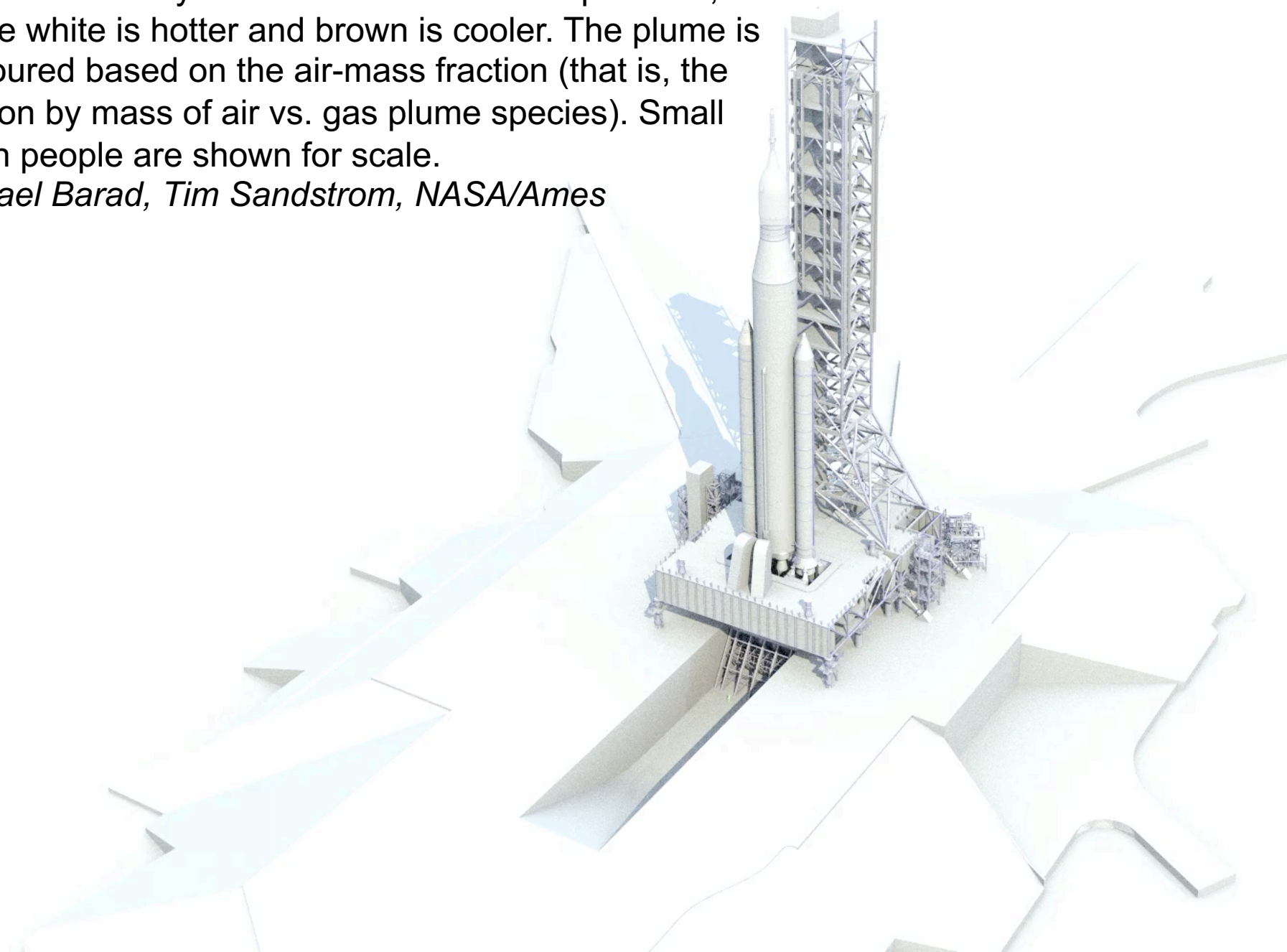
SUI Quadcopter 5% tip chord Lattice-Boltzmann simulation: isosurfaces of Q-criterion colored by vertical velocity and cut plane colored by logarithm of pressure gradient magnitude

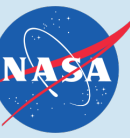
Video Credit: Francois Cadieux



Simulation of launch ignition for NASA's next-generation Space Launch System. Colors indicate temperature, where white is hotter and brown is cooler. The plume is contoured based on the air-mass fraction (that is, the fraction by mass of air vs. gas plume species). Small green people are shown for scale.

*Michael Barad, Tim Sandstrom, NASA/Ames*





# Flight Test Validation

Pad Abort 1 flight test where Orion LAS accelerates from rest to 10x Earth's gravity

Video shows passive particles seeded at the nozzle colored by velocity magnitude: white is fast, dark orange is slow

