National Aeronautics and
Space Administration

SLS Block 1 vehicle flight and wind tunnel geometries, showing both the flight flow field (left) and the wind tunnel flow field (right), simulated using NASA's FUN3D code. This vehicle will be used for Exploration Mission 1, the first SLS flight. The vehicle surface is colored by pressure contours, where blue is low and red is high. The green-white-orange colors represent low to high velocities.
Henry Lee, Stuart Rogers, NASA/Ames

SLS Block 1 (cargo variant) flight and wind tunnel geometries, also simulated using the FUN3D code. Note the differences in shape from the vehicle shown in the other image, and how this affects both the flight flow field (left) and the wind tunnel flow field (right). This vehicle has been proposed for the Europa Clipper science mission. *Jamie Meeroff, Derek Dalle, NASA/Ames*

Aerodynamic Databases for the Space Launch System

NASA's Space Launch System (SLS) will be the most powerful rocket ever built, enabling astronauts and cargo to travel into deep space. The SLS Computational Fluid Dynamics (CFD) team uses CFD simulations to build multiple aerodynamic databases covering all aspects of flight from ascent through stage separation. To build the most recent databases, the team ran approximately 8,000 simulations using 125 million core-hours on NASA's Pleiades and Electra supercomputers, including 5,000 simulations of the SLS Block 1 vehicle in preparation for design certification review of the first SLS flight, Exploration Mission-1. The team is also supporting the preliminary design review for the SLS Block 1 cargo variant proposed for the Europa Clipper science mission, which is scheduled to launch in the early 2020s.

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