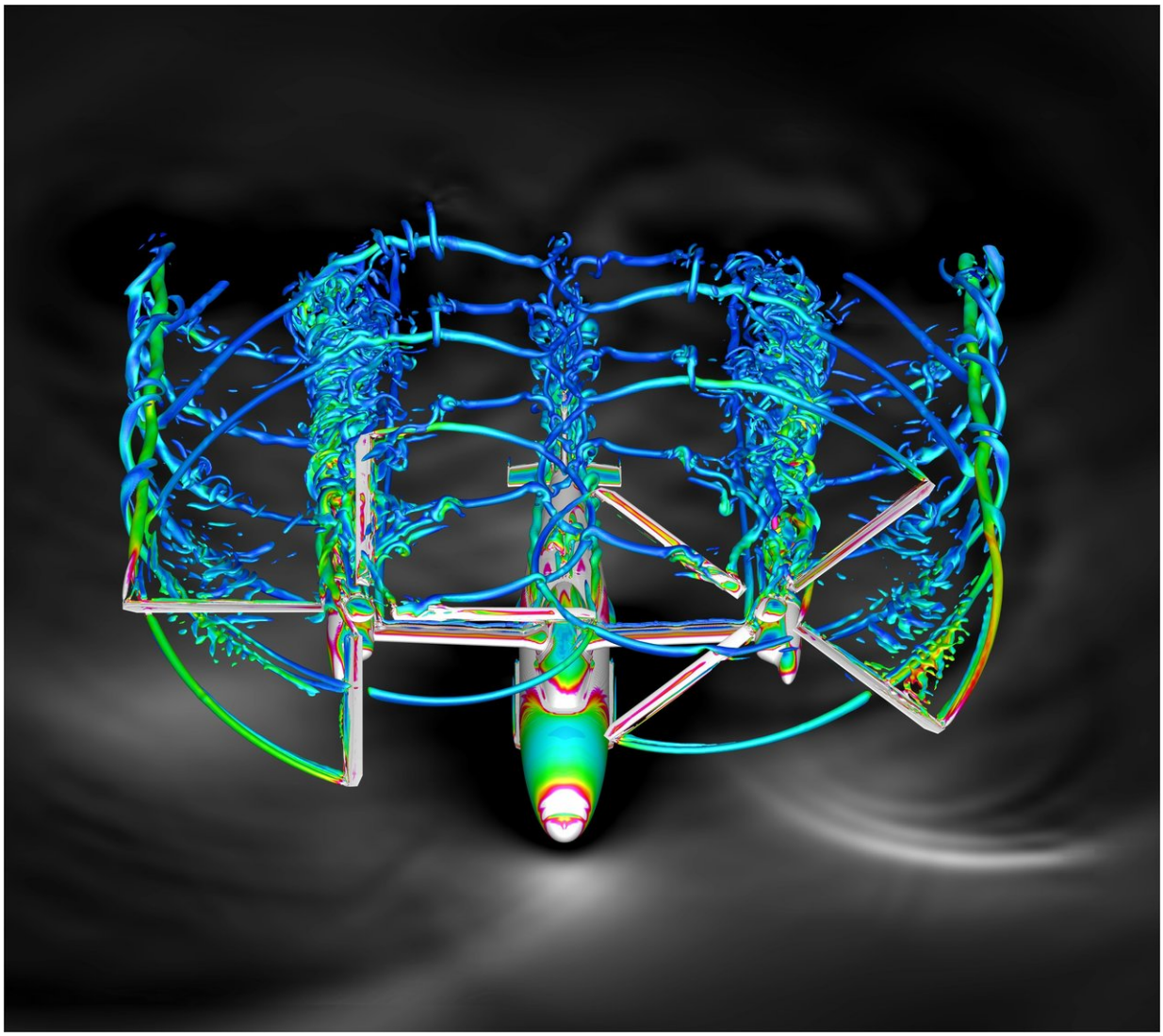
Toward urban air mobility: Air taxis with side-by-side rotors

November 16 2018



Visualization of NASA's side-by-side rotorcraft concept for UAM in forward flight. This back view shows the complex 3D vortex wake from the intermeshing

rotors. Note the rolling of the vortex wake at far right and left. Interactions of the vortices in the overlapping region (center) produce a roll-up of the wake. Vortices are colored by vorticity magnitude (magenta is high; blue is low). Pressure is shown below and in front of the vehicle. These complex flow interactions and details can only be captured with high-fidelity CFD and high-order accurate schemes. Credit: Patricia Ventura Diaz, NASA Ames

In this high-resolution visualization of NASA's side-by-side, intermeshing rotor air taxi concept, researchers are working to understand complex rotor air flow interactions, simulated using high-fidelity computational fluid dynamics methods. The image/video shows the vortex wake, colored according to pressure. Intermeshing rotors offer the advantage of being more compact while being more efficient in cruise than twin-motored helicopters without overlapping rotors. How do NASA engineers conduct such research? They do so with the help of some of the most powerful supercomputers in the world, giving them the capability to solve complex computational problems in just a few days.

Urban Air Mobility, a safe and efficient system which supports a mix of onboard/ground-piloted and increasingly autonomous operations – is the new era of transportation. UAM vehicles are envisioned to be autonomous, using electric or hybrid propulsion to transport a small number of passengers and cargo from one point in an urban area to another, avoiding all ground traffic. These rotary wing vehicles would also have the capacity for vertical take-off and landing, eliminating the need for long runways.

Research like this was highlighted at this year's supercomputing conference, SC18. For more information about NASA's participation, visit www.nas.nasa.gov/SC18/ .

Provided by NASA