The Air Force Research Laboratory (AFRL) is developing a new unmanned airplane that the military and NASA will use to test the effect of air flow on flexible wings to promote innovations in lightweight aircraft design.

This summer, NASA's Dryden Flight Research Center will oversee Air Force tests of the Multi-Use Technology Testbed (MUTT), a new X-plane called the X-56A that Lockheed Martin is building under contract for the AFRL. The MUTT is seven and a half feet long, has a 28-foot wingspan, and weighs 480 pounds. Two 52-pound thrust JetCat P200-SX turbine engines power the low-speed plane, according to NASA.

AFRL researchers plan to use the tests to inform decisions on future designs of both subsonic and supersonic aircraft, particularly in the areas of building more stable wing design and lowering both aircraft noise and emissions.

US airspace will one day be open for unmanned aircraft, and the government is exploring ways to make them safer for flight. They also hope to reduce aircraft greenhouse gas emissions.

Researchers will use knowledge gained from the MUTT tests to create technology to quiet sonic booms, the noise of which currently prevents supersonic commercial flight over land in the US, according to the Air Force.

Specifically, the Air Force tests will focus on the effect of vibrations, called flutter, that result from the force of air over the X-56A's wings, which are longer and thinner than those on conventional aircrafts, according to NASA. Flutter can cause aircraft instability and even cause a plane to crash.

Long, flexible aircraft wings can also bend under pressure from wind gusts and atmospheric turbulence, and researchers will use the MUTT to discover ways to compensate for these factors to make future lightweight aircraft safer, according to NASA. Following the Air Force tests, NASA will take over ownership of the MUTT to continue its own research into lightweight structures and other technologies for future low-emissions transport aircraft.

"To maintain the long-term health of the structure and ride quality in a more flexible airplane, we need to actively alleviate gust loads on the airplane and suppress flutter, so gust load alleviation and active flutter suppression are two of the key technologies that NASA is working to advance," says Gary Martin, deputy project manager for NASA's Subsonic Fixed Wing Project at Dryden, in a press statement.

To allow for the testing of various wing configurations and other advanced aerodynamics concepts, designers have outfitted the MUTT with two key features, according to the AFRL. The aircraft's wings can easily be replaced, and designers are also building a hard point into the X-56A's fuselage so researchers can mount an additional third engine or some other structural support for testing of joined wing configurations.

The X-56A will also include built-in software to allow engineers to practice flutter suppression by adjusting programs within the flight control computer, according to the AFRL.