



NASA's Quesst Mission





Artist illustration of the X-59 taking off from a runway close to where the airplane is being assembled and tested at Lockheed Martin's Skunk Works facility in Palmdale, California. Credit: Lockheed Martin

Quiet Supersonic Flight Over Land

Quesst is NASA's mission to demonstrate the X-59's ability to fly supersonic without generating loud sonic booms and then survey what people hear when it flies overhead. Reaction to the quieter sonic "thumps" will be shared with regulators to help inform acceptable noise thresholds for faster-than-sound flight over land. Providing this data could usher in a new era of quiet supersonic flight, greatly reducing flight times.

Sonic Boom 101

When an aircraft travels faster than the speed of sound, shock waves form and travel away from the aircraft. Normally, these shock waves merge and generate disruptive sonic booms heard on the ground for miles on either side of the aircraft's flight path. The X-59 is shaped in a way that prevents the shock waves from coming together, resulting in a gentle sonic thump instead of the loud sonic boom produced by other supersonic aircraft.



Computer simulation showing how shock waves move away from the X-59 as it flies faster than sound. The pattern is different from the way shock waves from a conventional supersonic aircraft come together to produce a sonic boom. Instead, the X-59 will produce a quieter sonic thump. Credit: NASA

Testing the X-59

NASA and Lockheed Martin Skunk Works in Palmdale, California, designed, built, and will soon conduct initial flight testing of the X-59.

The single-seat X-59 is 99.7 feet long, 29.5 feet wide, and can cruise at an altitude of 55,000 feet while moving at a speed of Mach 1.4 or 925 mph.

Through a series of flight tests, NASA and Lockheed Martin will work together to prove the X-59 performs as designed and is safe to fly in the U.S. airspace system. After these tests, NASA will conduct a series of validation flights to demonstrate the quiet supersonic technology works and sonic thumps are heard on the ground as expected.



An artist illustration of NASA's X-59 in flight over land with cities and rural areas below. When the X-59 enters its community testing phase, it will fly over several U.S. cities to gather data on how effective the technology is in terms of public acceptance. Credit: Lockheed Martin

Collecting the Data

Later in the mission, NASA will begin flying the X-59 over several communities (yet to be selected) and ask residents for input about the sonic thumps they may or may not hear. That information will be delivered to the Federal Aviation Administration and international regulators for their use in establishing acceptable noise thresholds for commercial supersonic flight over land.

Collaborative Effort

All four of NASA's field centers in California, Ohio, and Virginia that conduct aeronautics research have key roles in developing and evaluating the X-59. Together with its partners in government, industry, and academia, NASA hopes to enable a new era in supersonic commercial aviation.