



# NEW AVIATION HORIZONS

CLEANER, FASTER, QUIETER

## NASA Aeronautics Proposes Return of X-Planes

American aviation stands on the cusp of a new era in flight that's dramatically cleaner, quieter, more efficient, and sometimes moves faster than the speed of sound.

NASA Aeronautics is in the right place at the right time with the right technology to mount its own "moon shot" – a bold 10-year plan that includes "New Aviation Horizons," an initiative that heralds the return of X-planes. It's been years since NASA last had the opportunity to invest in piloted X-planes -- experimental airplanes that are created exclusively for demonstrating NASA-developed revolutionary technologies in flight, helping to reduce the time it takes for industry to adopt those technologies.

NASA and its partners in industry, academia and government intend to design, build and fly a fleet of X-planes, accelerating our nation's move to green aviation that's dramatically more Earth-friendly; inspiring to industry, the next generation workforce and the flying public; and able to drive our economy to new heights.



### STARC

Electric power is now seen as the new frontier for providing thrust and power for flight. With this experimental single-aisle turboelectric aircraft, NASA intends to demonstrate the feasibility of using a fuel-saving hybrid turboelectric system in a single-aisle commercial transport.

- Size: Large-scale (50 percent)
- Piloted for safe flight in public airspace
- Electric motors attached to turbofan engines distribute power through aircraft and reduce drag
- Electric motor-driven tail cone reduces drag from wake, improving efficiency and making it possible to reduce size of wing engines
- T-tail accommodates tail-mounted fan
- First possible flight: 2025
- Cool Facts: This X-plane takes advantage of today's tube-and-wing shape to provide a nearer-term electric solution. Studies show that the electric systems added to the wing engines and the tail could save an additional 5-10% energy.



### Quiet Supersonic Technology (QueSST)

This faster-than-sound X-plane is designed to help remove current regulations banning supersonic flight over land, opening up the possibility for entirely new markets for building and flying a new class of aircraft. Instead of the double-boom of current supersonic airplanes, QueSST would have a soft thump – a "heartbeat" – that people on the ground may not even notice.

- Size: Large-scale (90-foot length); simulates supersonic sound of a future 100-passenger supersonic airplane
- Piloted for safe flight in public airspace
- Sonic "thump" instead of sonic boom
- Uses existing engines for low cost but burns alternative fuel to study effects on emissions
- First possible flight: 2019
- Cool Facts: A U.S. coast-to-coast flight could take only three hours instead of six or seven. The total U.S. economic benefit from manufacturing and employment related to these new airplanes would be \$20-\$60 billion per year.

[www.nasa.gov/aero](http://www.nasa.gov/aero)

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### Ultra-Efficient Hybrid Wing Body (HWB)

One of several possible new X-plane configurations, the HWB would break the mold of the traditional tube-and-wing shape. NASA plans to develop and build three different subsonic transport-class X-planes to test a variety of specific technologies that could reduce the environmental footprint of aviation.

- Size: Large-scale (50 percent)
- Piloted for safe flight in public airspace
- Non-circular pressurized fuselage
- Top-mounted engines to shield noise from ground
- Multiple technologies tested for use on multiple platforms (structures, materials, aerodynamics, flight controls, propulsion/airframe integration)
- Designed for initial application as a cargo transport
- First possible flight: 2023
- Cool Facts: This shape is so aerodynamically efficient that its fuel use and carbon footprint would be 40-60% less than today's most efficient airplane, and would produce less than half the perceived noise.



### SCEPTOR

This small commuter-sized X-plane would be entirely powered by electricity. Its name stands for "Scalable Convergent Electric Propulsion Technology Operations Research."

- Size: Small-scale (general aviation size)
- Piloted for safe flight in public airspace
- Multiple small electric engines installed along entire wing
- Wing placed higher on fuselage
- Based on a Tecnam P2006T light aircraft
- Designed to be learning tool for technologies that could be on larger airplanes, or could be spun off to the general aviation market
- First possible flight: 2018
- Cool Fact: Compared to typical general aviation aircraft, this X-plane would demonstrate nearly five-times increase in energy efficiency.