



Variable Geometry Aircraft Wing Supported By Struts and/or Trusses

NASA has patented a new technology for an aircraft configuration that utilizes a strut/truss-braced oblique variable-sweep wing mounted on a constant cross-section geometry fuselage. In practice, the wing would start in a position closely aligned with the fuselage. This allows the aircraft to easily maneuver within the terminal/ramp area, and promotes higher density terminal operations. The wing could remain aligned during taxiing, reducing the chance of collisions with other taxiing aircraft. During the runup/checkout before takeoff, the wing would be rotated to the unswept position for increased climb performance and noise abatement. Once airborne, the wing would be pivoted to the sweep angle that provides the best aerodynamic performance and noise abatement at the current speed. During cruise, both speed and sweep angles could be adjusted accordingly. Before final approach, the wing would again be rotated to the perpendicular position in order to improve the aircraft's low-speed performance. As the aircraft departs the runway for the taxiway, the wing would be rotated again to align with the fuselage, greatly reducing the possibility of collisions during taxiing.

This patented technology is available for licensing from NASA's aeronautics program to benefit U.S. industry.

Technology Details

This innovation utilizes a strut/truss-braced oblique variable-sweep wing mounted on a constant cross-section geometry fuselage. The combination of the strut/truss-bracing with the oblique wing greatly reduces the structural and weight penalties previously associated with unbraced oblique wing configurations while maintaining the oblique wing's improved aerodynamic performance. Strut/truss bracing helps to further reduce the wing weight, and can be used to automatically align wing-mounted engines with the oncoming flow. The synergistic combination of these design elements provides the aircraft with a wide and efficient cruise speed range when the wing is at intermediate sweep positions, and superior low speed performance when the wing is unswept. This wide speed envelope provides future air traffic systems with additional flexibility when scheduling efficient arrivals and departures. The improved climb performance of the straight wing reduces the neighborhood noise footprint of the aircraft as it departs the airport. Efficient aircraft designs are increasingly desired in order to support the continued growth of the air transportation industry. Continued expansion of this vital mode of transportation is threatened by ever-increasing challenges in emissions, noise, and fuel efficiency.

Commercial Applications

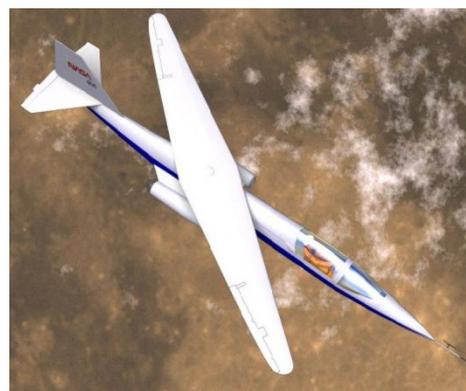
- Aerospace Engineering
- Aircraft
- Systems Engineering
- Manufacturing
- Unmanned Aerial Vehicles (UAV)

Patent

This technology is protected by a pending U.S. Non-Provisional Patent Application. (Reference No. ARC-16752-1)

Benefits

- Reduced noise during takeoff and landing
- Weight penalty can be substantially reduced by using the strut/truss brace
- Simplified lightweight high-lift (flap) systems
- Approach and landing speeds would be greatly reduced
- Improved aerodynamic performance
- Reduces the possibility of collision during taxiing and improving gate access
- Flexibility in cruise speed operations



Oblique-wing aircraft