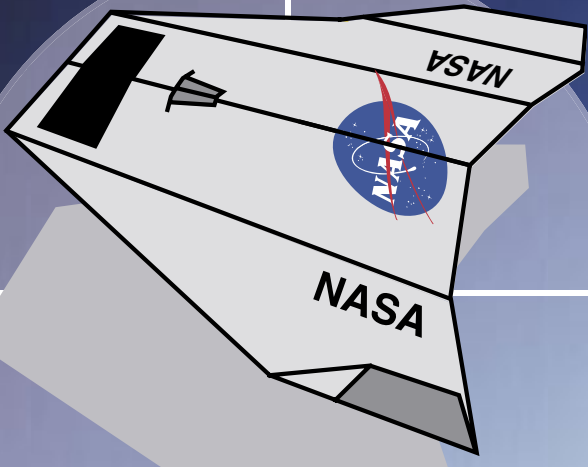


Future Flight Design

Grades 4-7




Scramjet
X-43A Research Vehicle

Length: 3.7 m (12 ft)
Height: 1.2 m (4 ft)
Wingspan: 1.5 m (5 ft)

Materials: Composite with aluminum ballast

Speed: Mach 9.63 (7,330 mph)
Max. Altitude: 33 km (109,000 ft)
Range: Released from B-52 over open water
Max. Weight: 1,360 kg (3,000 lbs)



F-16
F-16XL with Digital Flight Control System

Length: 16.5 m (54 ft 3 in)
Height: 5.4 m (17 ft 8 in)
Wingspan: 10.5 m (34 ft 4 in)

Materials: Primarily aluminum alloy


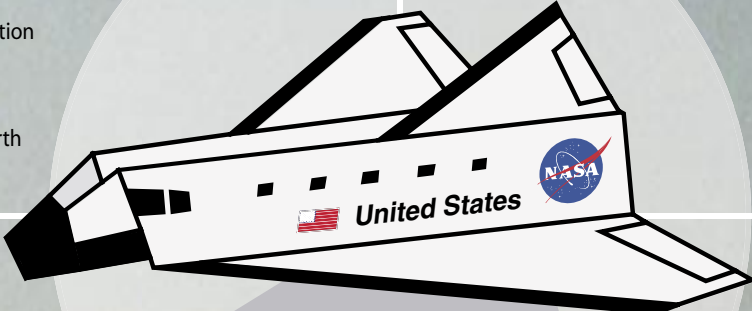
Speed: Mach 2 (1,500 mph)
Max. Altitude: 15 km (50,000 ft)
Range: 3,900 km (2,425 mi)
Max. Weight: 16,875 kg (37,500 lbs)

Space Shuttle
Wide-Body, Delta-Winged Airplane and Space Vehicle

Length: 37.2 m (122 ft 2 in)
Height: 17.3 m (56 ft 8 in)
Wingspan: 23.8 m (78 ft 1 in)

Materials: Aluminum plus surface insulation

Speed: Mach 23.6 (18,000 mph)
Max. Altitude: 45 km (147,638 ft)
Range: Multiple orbits around the Earth
Max. Weight: 104,328 kg (230,004 lbs)



Centurion
Solar-Powered Research Aircraft

Length: 2.0 m (6 ft 6 in)
Height: 1.5 m (5 ft)
Wingspan: 61.8 m (206 ft)

Materials: Carbon fiber with Kevlar

Speed: Mach 0.027 (21 mph)
Max. Altitude: 30.5 km (100,000 ft)
Range: Continuous flight for 6 months
Max. Weight: 272 kg (600 lbs)

How do shape and materials affect an aircraft's ability to carry cargo?