Northrop Grumman artist's concept

Procurement budgets may be limited, but technology continues to evolve.

WINGS TO

On these pages are some of the new and serious concepts being pursued by the Pentagon, NASA, and the aerospace industry to meet emerging requirements and take advantage of the state of the art in materials, propulsion, and aerodynamic research.

At left is Northrop Grumman's design for a possible Future Strike Aircraft. The company is working on a one-year Defense Advanced Research Projects Agency contract, worth up to $2.5 million, to develop a supersonic cruising attack airplane that produces a sonic boom less intense than that of today's aircraft. The research has application to future airliners as well as to military aircraft. Current plans call for USAF to begin work on a next-generation bomber within 15 years.

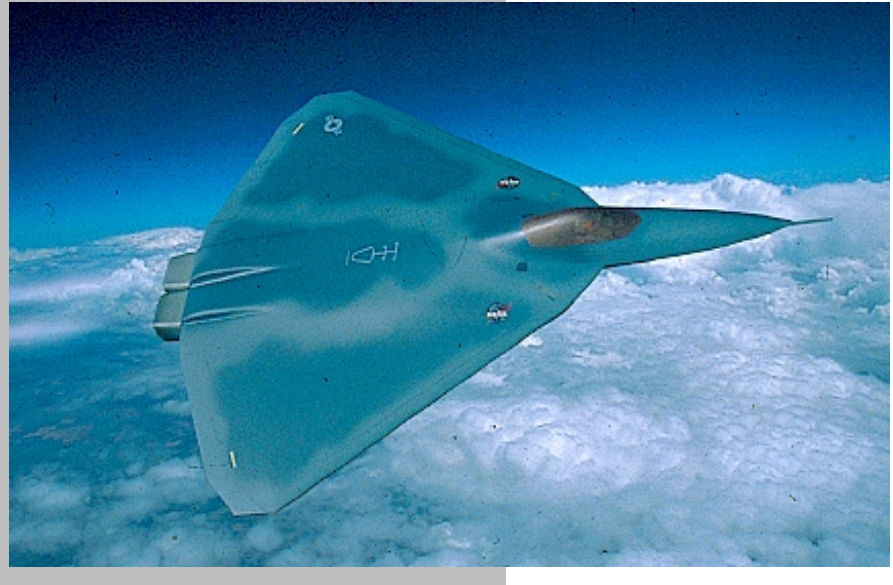


Photo illustration by Erik Simonsen

Lockheed Martin has proposed a research aircraft (above) based on the F-22, to be called the X-44. It would have no flaps, ailerons, rudder, or other control surfaces. Instead, the aircraft's flight path would be controlled purely by the movement of two multiaxis thrust-vectoring exhaust nozzles.

COME

By John A. Tirpak, Senior Editor

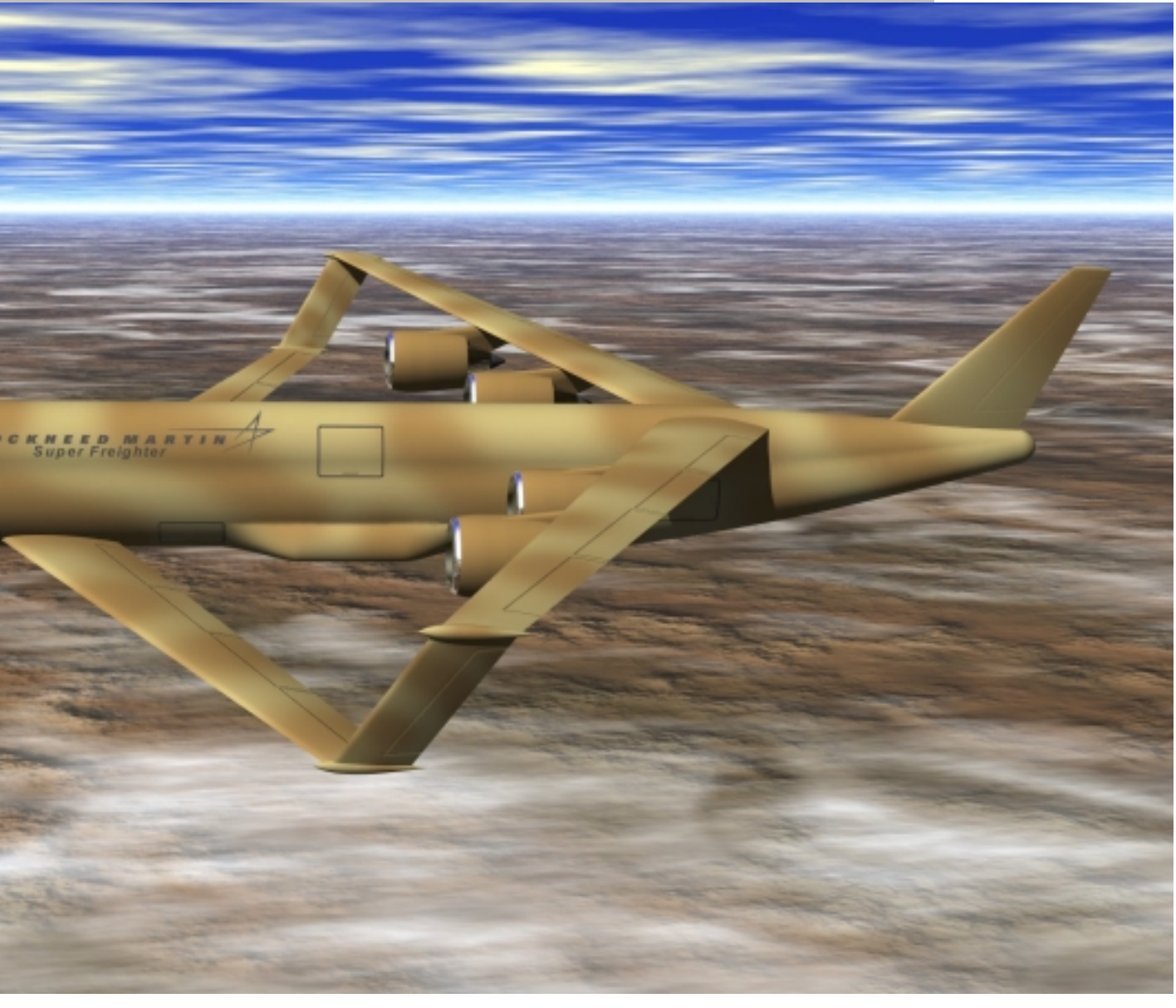
Photo illustration by Erik Simonsen

NASA is exploring the possibilities of a large blended-wing airplane. With a span of well over 200 feet, the aircraft would have prodigious internal volume for carrying cargo or fuel for aerial tanking purposes. The large wing surface would give the airplane tremendous ability to lift payloads and carry them long distances with increased fuel economy. However, the design would crowd other airplanes on the ramp and thus would require large airfields. At far right, the blended wing in a NASA wind tunnel; at right, as it might appear in Air Mobility Command service.

Lockheed Martin photo by John Rossino

Lockheed Martin would solve the ramp space problem by making a future tanker a biplane. The joined-wing, or box-wing, concept would allow for shorter wingspan with greater lift capability. Above, a radio-controlled model demonstrates that it will fly; at right, an artist's concept of the biplane freighter in service.

NASA photo

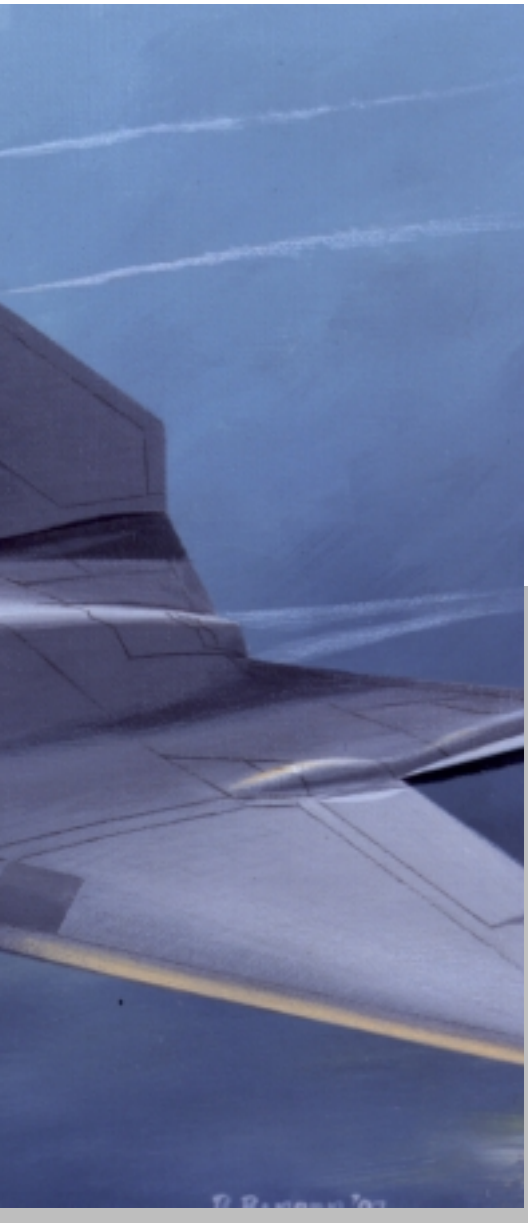


Lockheed Martin artist's concept

Lockheed Martin artist's concept

The US currently enjoys a monopoly on fielded stealth aircraft, but other nations are looking at stealth for their next generation of combat airplanes. At right is a BAE Systems concept employing a cranked-delta wing. Outside the US, the UK is considered to have the most capability in stealth design.

BAE Systems artist's concept



Lockheed Martin has developed a future fighter concept (left) in which the pilot would be optional. One version would be an Unmanned Combat Air Vehicle for especially dangerous missions, while another variant would have a cockpit that would be used only when there was need for a pilot. A common assembly line would reduce overall costs for the fighter-size aircraft.

NASA photo by Patrick Wright

Scaled Composites is developing the Proteus aircraft (above) for a variety of missions, one of which might be to serve as a regional relay platform for communications, substituting for a satellite. The aircraft will cruise between 59,000 and 65,000 feet for a maximum duration of 18 hours. Other missions might include atmospheric research, reconnaissance, and launch of small satellites. The Proteus has a wingspan of more than 77 feet, expandable to 92 feet, and a length of more than 56 feet, but weighs only as much as a midsize car.

NASA photo by Nick Galante

NASA's unmanned Pathfinder Plus flying wing (above) is the basis for another possible aerial signals relay platform. The aircraft is powered by the solar panels on its wings and is designed to stay aloft for weeks at a time, at extremely high altitude. Designed by AeroVironment, it set a propeller-driven-aircraft altitude record of 80,285 feet in 1998. Plans call for later versions to fly at sustained altitudes in excess of 100,000 feet.

The Air Force has a near-term need for a Space Maneuver Vehicle that can be rapidly launched, perform tasks in orbit, return to Earth autonomously, and turn quickly for another mission. The X-40A (below) is a subscale prototype that has accomplished several low-altitude free-flight tests. The larger X-37 version will be lofted into space on a Delta rocket or on the space shuttle and will demonstrate return from orbit. The Space Operating Vehicle is the bus that would take the SMV and small satellites to orbit (right). Reusability and speed of turnaround are the hallmarks of the effort.

NASA photo by Tony Landis

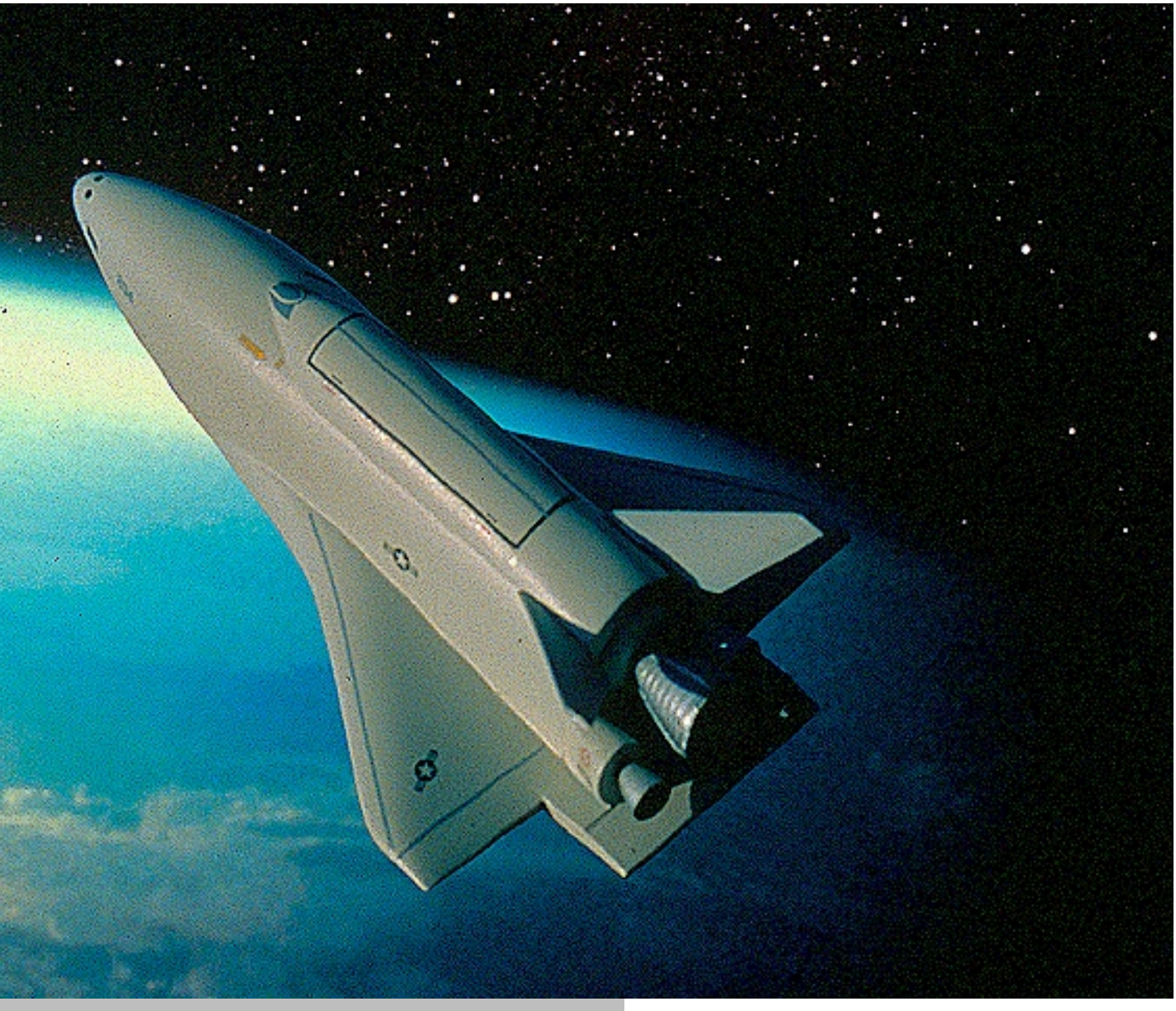


Photo illustration by Erik Simonsen

Bell Helicopter/Textron artist's concept

Bell is investigating a possible expanded version of its V-22 Osprey tilt-rotor. Dubbed V-44, the quad tilt-rotor (at left) would have the same fuselage size as a C-130 transport but would be able to take off and land vertically, eliminating the need for a runway. The concept has appeal for special operations forces needing transport to unimproved airfields or remote locations. ■