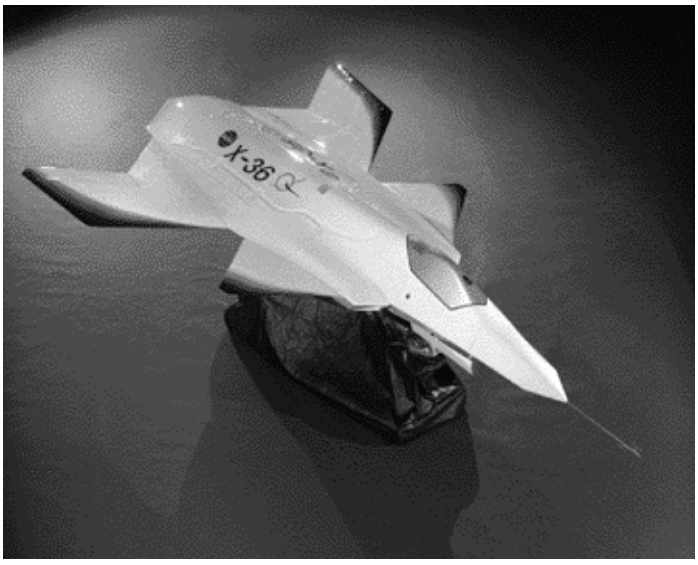
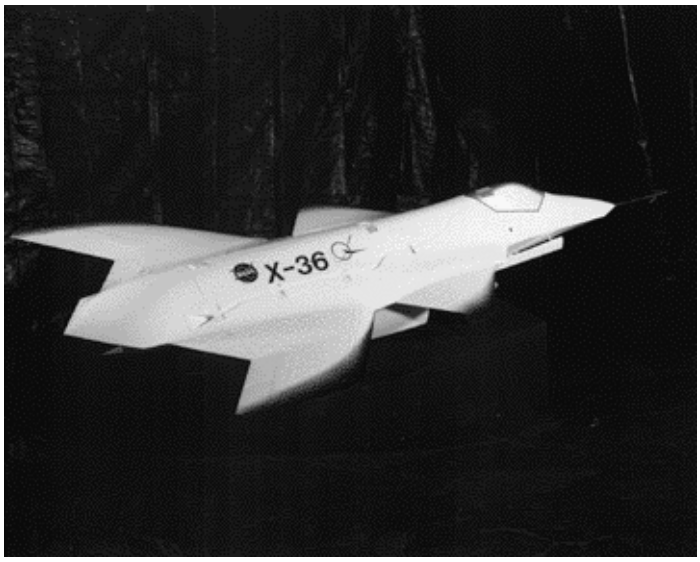
The X-36 “Backgrounder” Tailless Research Aircraft



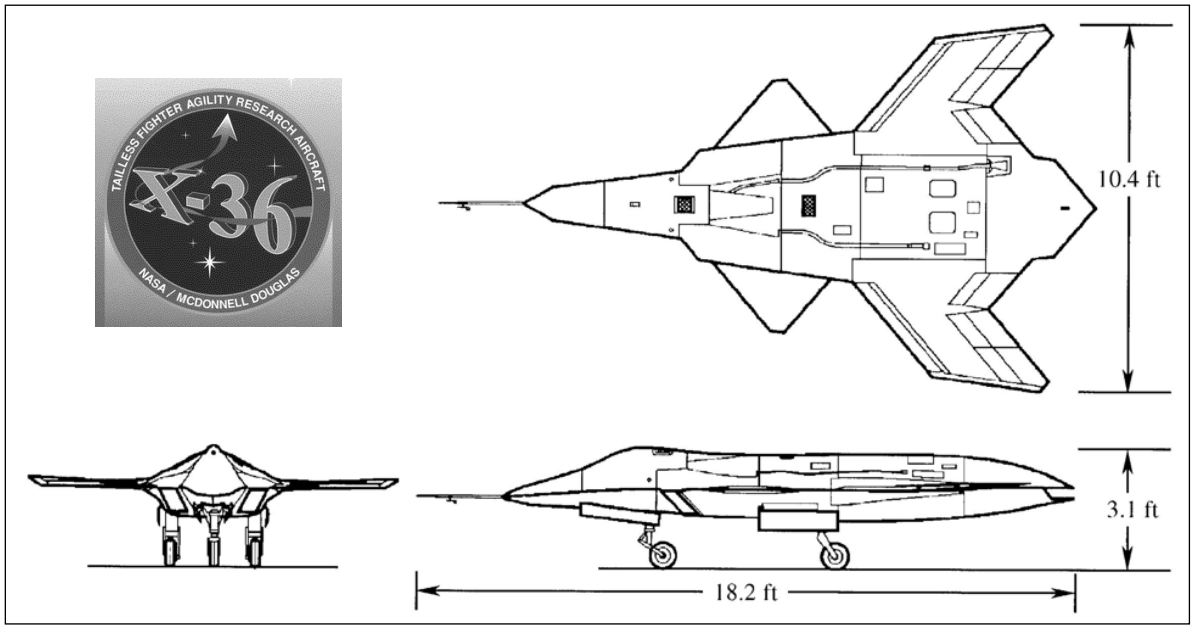
All you modelers of tailless planforms who have been asking about incorporating helicopter gyros to control yaw now have a platform to test out your ideas!

The X-36 “Backgrounder” was developed jointly by McDonnell Douglas and the National Aeronautics and Space Administration over a 28 month period, at a cost of $17 million. Rollout of the 28 percent scale X-36 at McDonnell Douglas Corp., St. Louis, took place on 19 March 1996. A six month testing program, consisting of 25 flights, was scheduled to begin that summer. High speed taxi tests were done in October.

The “Backgrounder” is considered to be a tailless design, as it has no vertical or horizontal tail surfaces. The canard surfaces are apparently not moveable but do control airflow over the wing at very high angles of attack — up to 35 degrees.



Yaw and pitch control are provided by split ailerons and thrust vectoring in this powered model. The result of this novel design concept is an airframe which is lighter and has less drag than conventional aircraft of the same size, with increased range as the result. It is anticipated that



substantial increases in maneuverability andsurvivability will also be realized, together with a very small RADAR signature.

Manufactured in McDonnell Douglas Phantom Works, the X-36 is an example of rapid prototyping capabilities and was intended to demonstrate new technologies at far less cost than a full size manned aircraft. The subscale X-36 is remotely piloted through a HUD (Head Up Display) system. A video camera in the aircraft allows the pilot to fly from a ground based virtual cockpit.

The airframe of the X-36 is of machined aluminum, the skins are of carbon and epoxy (non-autoclaved). The X-36 is stressed for 5 g's. With a maximum speed of Mach 0.6, an approach speed of 110 knots, and the high maximum angle of attack, flight performance should be quite exciting. The aircraft weighs 1,300 pounds fully fueled and is 18.2 feet long, 10.4 feet wide, and 3.1 feet high with landing gear extended. A Williams Research F112 engine provides 700 pounds of thrust.

The X-36 should make a good PSS subject. We are sure some enterprising modeler will take advantage of the current state of electronics and include not only a helicopter gyro, but also an onboard video camera. This could be set up to mimic the integrated remote control system used by NASA on the original. We would very much like to hear from anyone modeling this "model," particularly if such technologies are included.

Resources:

The 3-view and photographs included in this column are courtesy of McDonnell Douglas Corp. via the X-36 rollout web page at <http://ccf.arc.nasa.gov/dx/basket/storiesetc/X36pixjo.html>, and NASA Dryden Flight Research Center at <http://www.dfrc.nasa.gov/PhotoServer/X-36/contactSmall.html>.

X-36 “Backgrounder” undergoing high speed taxi tests

Penumbra.4 thermalling over the eastern slope at 60 Acres.