

X-31A TACTICAL UTILITY FLIGHT TESTING

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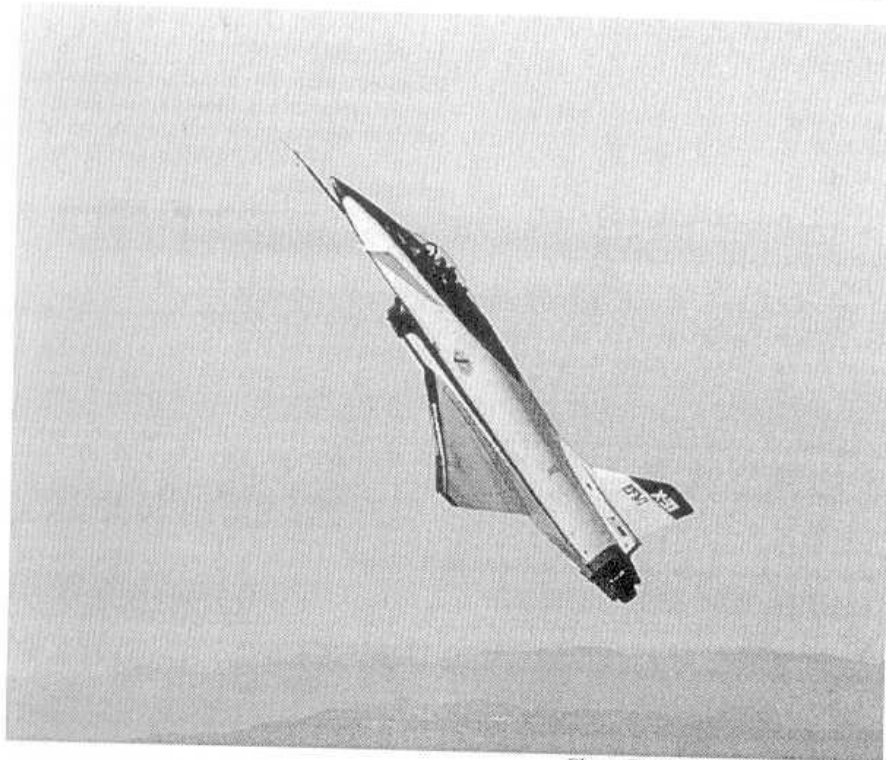


Figure 1: X-31A Flying at 70° AoA over Edwards AFB, CA

Photo Credit NASA Dryden FRC EC94-42478-16

1. ABSTRACT

The two X-31A were jointly built by Daimler-Benz Aerospace AG and Rockwell International. These German-American experimental aircraft were designed to explore the new realm of flight far beyond stall by employing advanced technologies like thrust vectoring and sophisticated flight control systems. The X-31A aircraft is equipped with a thrust vectoring system consisting of three aft mounted paddles to deflect the thrust vector in both pitch and yaw axes, thus providing the X-31A in this 'Enhanced Fighter Maneuverability' program with an agility and maneuverability never seen before. The tactical utility of the X-31A using post stall technologies has been revealed in an extensive flight test campaign against various current state-of-the-art fighter aircraft in a close-in combat arena. The test philosophy included both simulation and flight test. The tremendous tactical advantage of the X-31A during the tactical utility evaluation flight test phase was accompanied by a deepened insight into post stall tactics, its typical maneuvers, impacts on pilot-aircraft interfaces and requirements for future weapons to both engineers and the military community. Some selected aspects of the tactical utility of the X-31A using post stall technologies unveiled by the International Test Organization are presented here.

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2. NOMENCLATURE

AFB	Air Force Base
AGL	Above Ground Level
AoA	Angle of Attack
ARPA	Advanced Research Projects Agency
BVR	Beyond Visual Range
CIC	Close-in-Combat
Dasa	Daimler-Benz Aerospace AG
DLR	Deutsche Forschungsanstalt für Luft- und Raumfahrt
ECM	Electronic Counter Measures
EF	EuroFighter
EFM	Enhanced Fighter Maneuverability
FMOD	Federal Ministry of Defense
HUD	Head-Up Display
IABG	Industrie- und Anlagenbau Gesellschaft
IFF	Identification Friend Foe
ITO	International Test Organization
MBB	Messerschmidt Bölkow Blohm
MIL	Milli-Radian
MSL	Mean Sea Level
NASA	National Aeronautics and Space Administration
PST	Post Stall
QT	'Quasi-Tailless'
TES	Test and Evaluation Squadron