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## Science & Technology

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# NASA vs. Stockman: the XV-15 potential

by Robert Zubrin

It is ironic that, in its bid to impose greater "cost-effectiveness" on the U.S. government, the Heritage Foundation-controlled Office of Management and Budget (OMB) of David Stockman has singled out for elimination the aeronautics research budget of the National Aeronautics and Space Administration. In fact, NASA's aeronautics program probably offers the best cost-benefit ratio of any investment program in the world, public or private. An examination of just two of the many small programs conducted under the purview of NASA's \$296 million aeronautics budget, that for the XV-15 tilt-rotor convertible helicopter-airplane, and the more advanced X-wing convertible jet-helicopter illustrate this most strikingly.

### The advantages

Developed at a cost of \$22 million as a combined effort by NASA and the armed forces, the XV-15 promises to revolutionize military and civil aviation. Looking much like an ordinary two-engine propeller-driven aircraft, its two engines may tilt upwards, allowing it to take off, maneuver, and land like a helicopter. However, once in flight, its propellers may tilt forward allowing it to fly as a fixed-wing aircraft at speeds up to 350 knots. This compares to a maximum speed of about 160 knots for the fastest helicopters. As one Army colonel at the Pentagon put it, "The gunships we had in Vietnam could do a maximum of 140 knots. We haven't done any detailed studies on it, but it's obvious that if we had ships which could travel as fast as that [the XV-15], it would have saved many lives."

In addition, the XV-15 gets twice the fuel mileage as an ordinary helicopter. Since the U.S. Army spends over \$100 million a month on helicopter fuel, the potential cost-benefit even in peacetime would be enormous. Finally, the XV-15 has the capability of ascending to a height of 30,000 feet, compared to a typical ceiling of 10-14,000 for a helicopter. This offers not only

military advantages, but manifold possibilities for expanding the use of helicopters in civil aviation by allowing the vehicles to ascend to heights required to avoid air traffic congestion. According to a number of industry analysts, the XV-15 has the potential of developing into a whole new industry.

One XV-15 test vehicle already exists. But the question of whether the technology will be realized on a broad scale is still up in the air. "We need to document its precise performance, handling qualities, vibration characteristics, and aerodynamic stability." Shipboard tests are needed, as is 'map of the earth' flight testing; where the army flies the plane at low altitude between trees, and we need tests of its qualities in the way of electronic countermeasures," a NASA spokesman said. "But this will require another \$6 million over the next three years, in government money, in addition to the support we are getting from Bell Helicopter. If the aeronautics budget is zeroed, the XV-15 will go into the Aeronautics Museum and that will be the end of it."

### The X-wing

An even more revolutionary concept is being developed by NASA aeronautics at NASA's Lewis Research Center in Cleveland, Ohio. This is the convertible jet engine for use in a so-called X-wing aircraft. In this design, a conventional TF-34 turbofan jet engine is modified to use its power to turn a large rotor, allowing the craft to take off and perform as a helicopter. Once it reaches an appropriate height, however, the jet power is diverted from the rotor to an ordinary jet forward thrusting mode, while the rotor locks into place and becomes a wing. (The craft has no other fixed wings.) The X-wing then shoots forward, flying as a jet plane at speeds of 600 knots or more, a performance equalling that of a fast military jet transport or a B-52 bomber. Moreover, because it lacks both thick fixed wings and a large revolving rotor, the X-wing is an ideal candidate for Stealth technology, since it has a very small radar cross section. While not equalling the XV-15 tilt rotor in fuel economy, the X-wing jet still surpasses that of ordinary helicopters by a wide margin. If NASA's aeronautics budget is not zeroed, and the project receives the \$9 million it needs over the next 5 years, the first convertible engine should be ready to be tested at the Lewis labs by late 1983.

The above are just two of the many programs conducted by NASA's aeronautics division since the Agency's predecessor was set up in 1915. Other current research includes investigation of hypersonic and supersonic jets, as well as basic research into aerodynamics, materials, and propulsion. As Assistant Secretary of the Army for Research Development and Acquisition J.R. Shuley recently testified: "Some of these capabilities could not be replaced by the U.S. Army at any cost."