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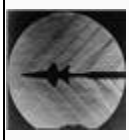


DARPA's Transformer - a Humvee That Flies

Posted by Graham Warwick 5:36 PM on Apr 16, 2010

DARPA's plan to develop a flying car - no, far more challenging, a Humvee that can take off and land vertically - has taken a step forward with release of a solicitation for its Transformer (TX) program.

(https://www.fbo.gov/download/d10/d10015bd49ec44f4414d65635bc1a37e/TX_BAA_Version_62_&_Appendix_A.pdf)

This is further that I thought it would get, because - despite all those decades of work on flying cars - this one looks truly "DARPA-hard".

Essentially, the research agency is looking for an SUV that can reconfigure rapidly into a VTOL air vehicle, cruise as fast as a light aircraft at up to 10,000ft altitude, and fly and/or drive 250nm on a single tank of fuel while carrying four people or 1,000lb of payload. A look through the extensive list of flying-car and roadable-aircraft designs, past and present, doesn't show any that could do that.

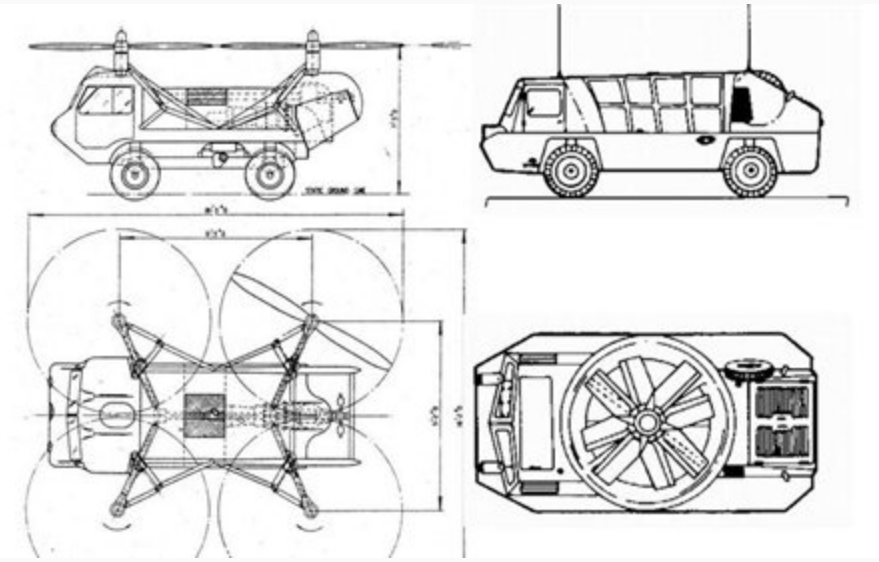
And to make it harder, DARPA would like an operational vehicle that does not require a certified pilot and can be operated autonomously; can do STOL as well as VTOL and handle a single lift-post failure; can go off-road with four-wheel drive; uses standard JP-8 fuel, can withstand small-arms fire and is as quiet as a car on the road and a light helicopter in flight.

Most roadable aircraft have been unsuccessful, and the handful in development would seem to fall short of either or both the "robust" and "VTOL" requirements. Looking for inspiration in the past, I checked out sectretprojects.co.uk, which pointed me to my treasured copy of Derek Wood's *Project Cancelled*, a brilliant treatise on the disaster that has been the British aircraft industry since 1945.

Sure enough there is a chapter on the British Army's Jumping Jeep project, cancelled in the 1960s, which was intended to develop a cross-country vehicle capable of flying itself across

rivers. This drew a number of proposals that might provide some inspiration (or pause for thought) to those interested in DARPA's Transformer.

They ranged from folding rotors to ducted fans:



Handley Page HP.120 (left) and Boulton Paul P.540

DARPA's TX program is divided into two tasks. Task A is to design a "robust field vehicle" and derive from that a full-scale prototype for ground and flight testing. Up to two teams will be awarded $3 million Phase 1 conceptual-design contracts, with options for Phase 2 detail-design contracts totalling $10 million. Then one would be selected for a $35 million Phase 3 contract to build and fly the demonstrator in late 2014.

Task B is a single-phase effort to develop technologies critical to the TX vehicle - such as lightweight propulsion, reconfigurable wings or ducted fans - for which up to three 17-month, $1 million contracts will be awarded, with the goal of incorporating them into the prototype. This seems designed to give innovative firms and non-traditional DoD suppliers a chance to participate in the program.

But I still wonder how DARPA's requirements can be met in a vehicle that is both robust enough to go off-road and light enough to take off vertically. We will have to wait and see who gets study contracts.

For sure loonies like Moller International will think they have a chance, as well as unknowns like Mundus Group's Roadable Aircraft, which is working on a ducted-fan design that at least looks like it might have some potential - if it works:

Concept: Roadable Aircraft

Tags:awt, DARPA