Flapping Thrust Unit General Concept

hosted by Pat D.

Call this a cross between a baby step and a publicity stunt. The intent of this project is to create a piloted flapping thing as quickly, cheaply and safely as possible. This sort of project should fall well within an affordable budget, making it a realistic backyard/garage effort. Here are some advantages to this proposal:

1) There is a reasonable expectation that this will actually WORK. The wings don't have to fully support the pilot and airframe; they merely act as large flapping propellers. Membrane flappers such as this have been used in models since the 1870's. Spencer's 7-Lb model lifted off a runway with four membrane flappers, and Kinkade's 6-Lb, 9 ft.-span membrane models fly very well. Can we simply scale up this propulsive effect to make a trike or paraglider lift off? There is absolutely no reason to think we can't!

2) This is not a huge nor expensive project. It requires an engine (I was told that some make of snomobile engine, available for less than $600, boasts 40 Hp and weighs only 85 Lb!) and several custom machined parts. A few items may be available through Grainger's or some other mechanical supplier. The rest is kite rods and fabric and elbow grease. Unlike some orni projects which have been proposed, this could be self-funded out-of-pocket without risking your mortgage.

3) At an expected 12 - 14 ft. span, the project need not cause embarassment. It can be safely hidden in a garage, and, depending on exactly how the wings are constructed, might be quickly dismantled/reassembled from a van or small pickup.

4) The thrust unit serves as its own testbed. The unit can be ground tested thoroughly before being fitted to an airframe. If it does not provide adequate thrust right off the bat, the builder can mess with the wing planform, gearing and other design parameters until it does, without the pain and indignity of scrapping an entire aircraft. Valuable data can be collected from this process.

5) This is a SAFE project. While ground testing may yield some entertaining mechanical and structural failures, no one is going to die in the process of developing this thing. Indeed, the development could evolve from fully static ground testing of the rig, through a go-cart version (this would be just one fun step in the dynamic thrust testing phase) and then to full-scale but remotely-piloted flying models developed from design criteria tested in the full-size, grounded test rig. Once the required level of thrust is obtained, and full-scale (or nearly full-scale) RC flight characteristics are well understood, the piloted airborne testing can be done with a paraglider outfit. The worst airborne failure in this scenario would leave the paraglider pilot with something like a dragchute trailing behind him... hardly the stuff of nightmares. Finally, the thruster could be adapted to a deltaplane trike or some other suitable airframe. All aspects of the performance and behavior of the device would be very familiar by that time.

6) It is worth doing. No flapping thing has ever unambiguously sustained a pilot in the air, so this would constitute a primary achievement in aviation history. The obvious objection is that this is not the "real thing." However, the "real thing" would be a prohibitively dangerous and expensive project to mount at this point. There are several proposed projects for the "real thing" which are unlikely to receive full funding or achieve true success any time soon; this is partly because nobody can point to anything even halfway "there". The flapping glides of Emil Hartman and Lippisch/Brustman before him convince noone, and more than one serious but overambitious university-based project is bogged in logistical and structural difficulties. But a ROG takeoff of a unit such as this would inspire plenty of excitement, and could (indirectly) lead to development funding for the "real thing." One merely need imagine a deltaplane trike pilot cruising in for a landing, with 14-feet span of four vigorously-flapping wings behind him at shoulder level... ask yourself if that would be "real" enough to silence skeptical objections to full-scale development.

The rubber-band powered 1/12 scale thruster model pictured below was constructed in less than five hours from scrap balsa and music wire, silver mylar party wrap, bamboo barbeque skewers and scotch tape. The deltaplane hang glider lifting surface was constructed of polyethylene foam packing material with garbage-bag twist-ties forming the "ribs". The model flies quite well despite appallingly shabby construction and no effort to conserve weight; it rises a few feet overhead and cruises in a broad circle before coming in on a dead-stick glide. This model was not constructed to "prove" anything, but merely to experiment on this configuration with various CG and thrustline positions. Devising a linkage which minimizes the aft vertical/horizontal disturbances is the next step...

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