December 2020
M2 Update

M2 Suspension & Nosewheel Test

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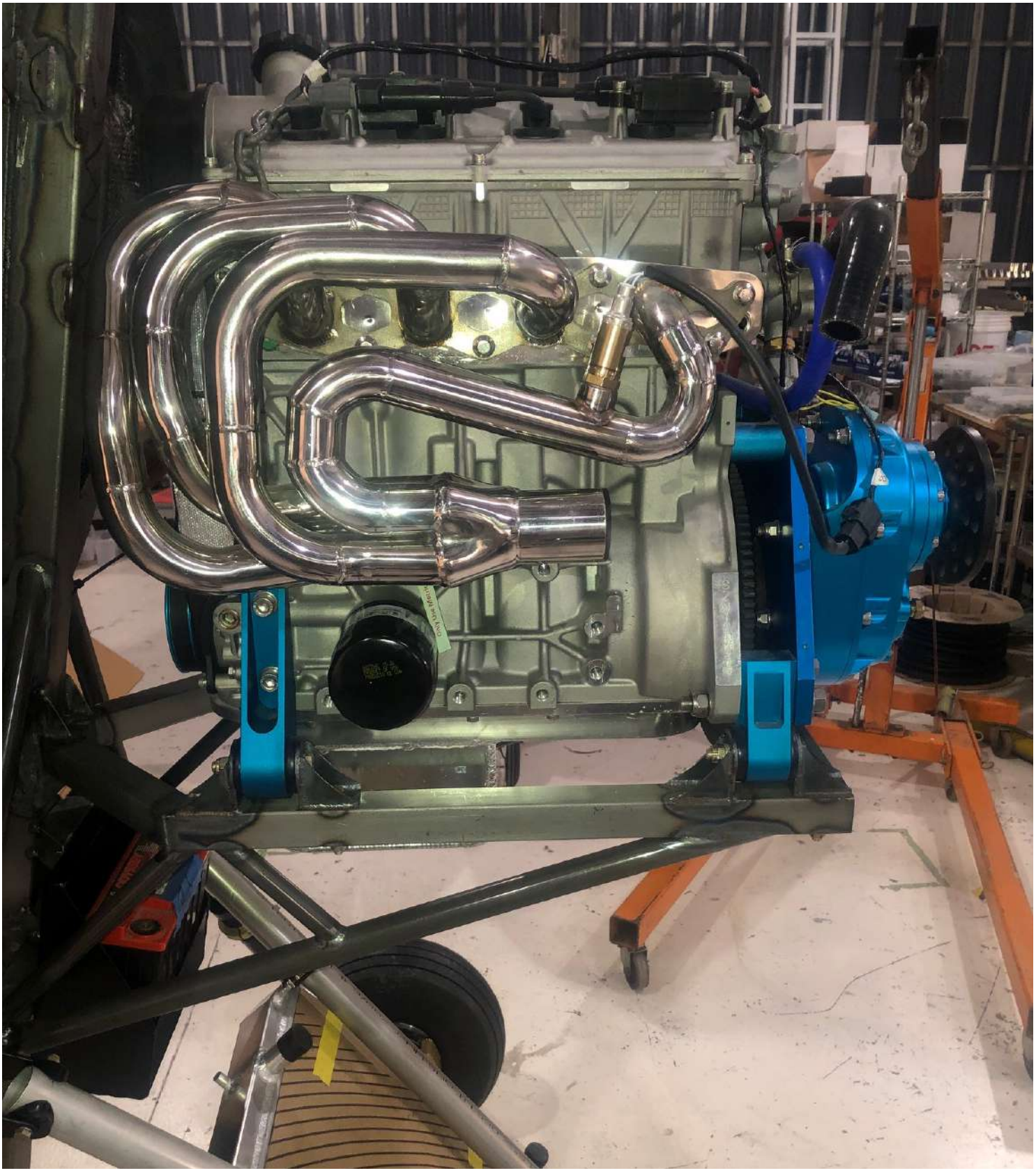
Originally developed for the Vortex M912 and well-proven for thousands of hours, the new M2 takes our renowned rugged design even further with twice as thick 1¼” diameter 4130 axles, stronger brakes with 4x the caliper area, and larger 6.00-6 tires.

On our airport ramp we created some rough-field conditions by laying down some 28 2x4 boards. Jim taxied over them many times, from both directions, at different speeds. The M2 simply glided over them, with very little jarring felt in the cockpit. Instead of using leaf-springs which store and rebound energy, our shocks absorb and dampen it.

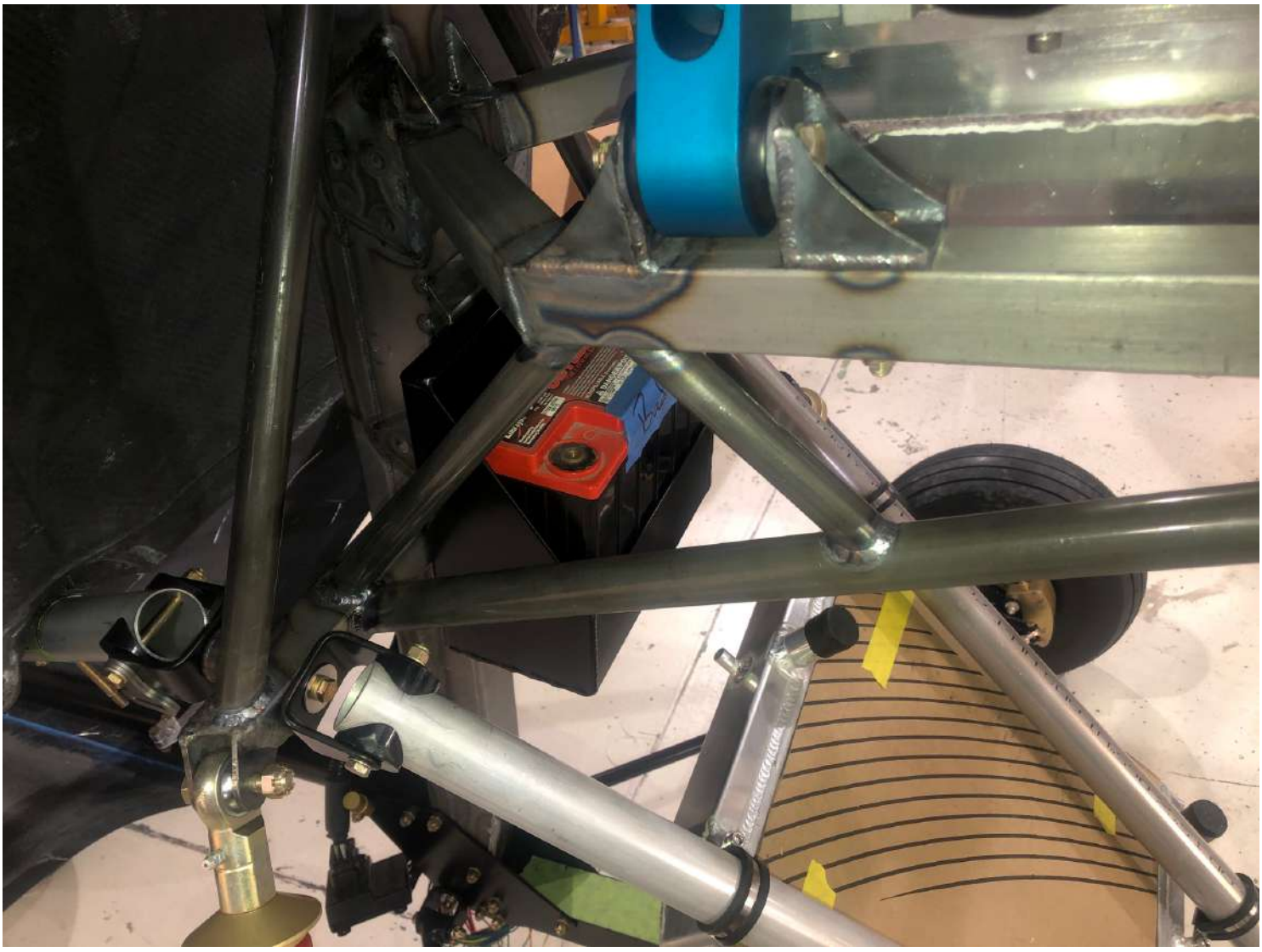
We know of no other gyro that can handle such corrugation — terrain which would very quickly shear off the common unsprung/noncastering nosewheel.

Engine Mount for Aeromomentum AM-15HP



The Aeromomentum AM-15HP in Upright configuration requires a bed mount, which we designed out of chrome-moly 4130 steel. This trussed frame is amply strong for the engine's wet weight of ~216 lbs. Engine oil changes and servicing are unhampered by the mount.

Notice the rear sets of mount ears are bolted to the frame. Removing these allows the engine to be easily slid off to the rear (vs. having to be lifted up).




AeroMomentum
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Bad

M2 Slotted Vertical Stabilizer

An aircraft tail must well provide two mutually exclusive goals:

Stability
Maneuverability

It is no easy task to design a properly balanced tail, especially in conjunction with a new body and prop. A tail may allow so much maneuverability that its stability suffers (e.g., in my owner opinion, the stock RAF without any horizontal stabilizer is notoriously pitch and yaw unstable, especially with doors on). Also, a too-small rudder can resist turning during low power settings without a strong propwash. Many modern gyroplanes, in our opinion, are under-tailed. (One gyro kit manufacturer had to post-production add a large dorsal fin to their vertical stab.)

For our new M2 we chose to shade toward stability, and then slightly reduce the effect of the tail if flight tests deemed it. Our solution is to retain the larger dimensions of the vertical stab and rudder (necessary during low-power operations), but to slot the vertical stab which evens out the strong propwash effect during high-power flight.

Cessna did this very thing to their C177 Cardinal's horizontal stabilator, which had much more power-pitch coupling than most C172 Skyhawk pilots were accustomed to (causing a lot of porpoised landings).

This highly functional slot will achieve our goal, without the uncomplimentary aesthetics of adding pieces to an undersized tail. Our first test of concept was on a sacrificial M912 tail, pictured below:

Due to the V-Spar™ construction of the carbon-fiber M2 tail, there will no appreciable loss of structural strength. The two separate slots will each be “boxed” with a pair of inside frames, replacing any lost rigidity from the slots.

Jim is now testing the first carbon-tail with vertical stab slots, and we’ll keep you posted with the results and some photos once we’ve painted the new slot frames.

Final Thoughts

Jim just flew the M2 again this afternoon. We’ll soon send and post lots of new exciting video footage of aggressive maneuvering, high-RRPM prerotation short take-offs, and the M2’s first soft-field take-offs/landings/taxiing!

He says it flies very, very nicely. He's had it already up to 110mph with our temporary plastic sheet doors (to test airflow and yaw stability). Without doors, the body A-pillars offers similar wind/rain protection as does the M912 with deflectors.

I've landed our M2-915 once so far; a complete no-brainer as it practically lands itself. Quick roll rate, I thought. The M2 is so forgiving of imperfect landings, it will be an ideal trainer!

In case we don’t have another Update this month, we all at Sport Copter wish you and your families a very Merry Christmas and Happy New Year. 2020 has been a strange year, so let’s rebound in 2021!

Kind regards and safe flying!

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“REMEMBER: WE BUILD THE BEST BECAUSE WE WILL ONLY FLY THE BEST!!”