

# Sport Copter M2 Progress up to November 2019

from 2018 Oshkosh:



to November 2019:



<http://www.sportcopter.com/Gyroplanes/M2/tabid/217/Default.aspx>

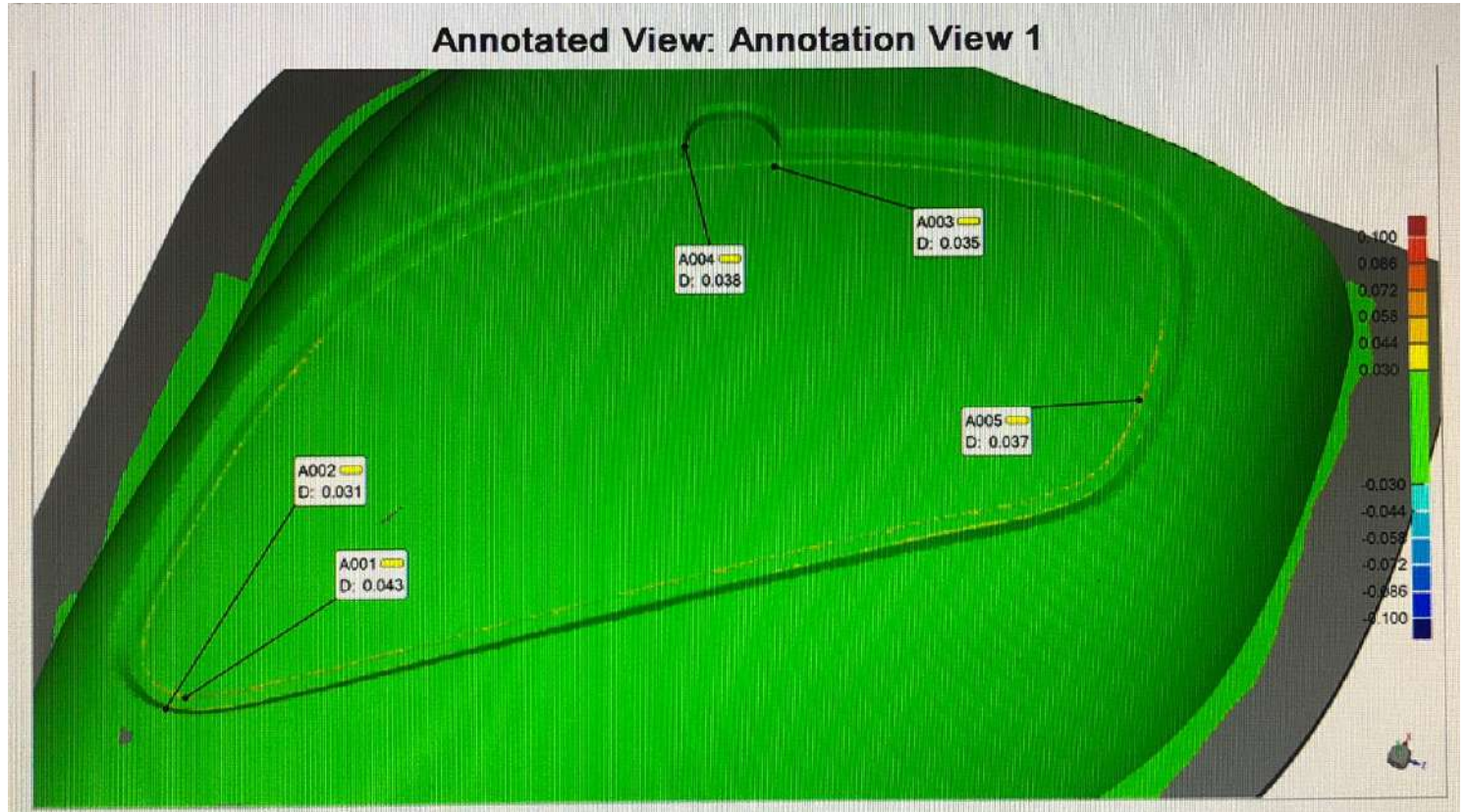
Greetings Sport Copter Pilots and Fans!

We have honed what was already a very good M2 into something even better:

- Pre-preg carbon tail (with a revolutionary internal structure, stronger than aluminum)
- Adjustable rudder pedals from SCII, and with improvements
- Heavier duty rotorhead/torque tube with larger bolts
- Slightly wider polycarbonate doors for more cabin comfort

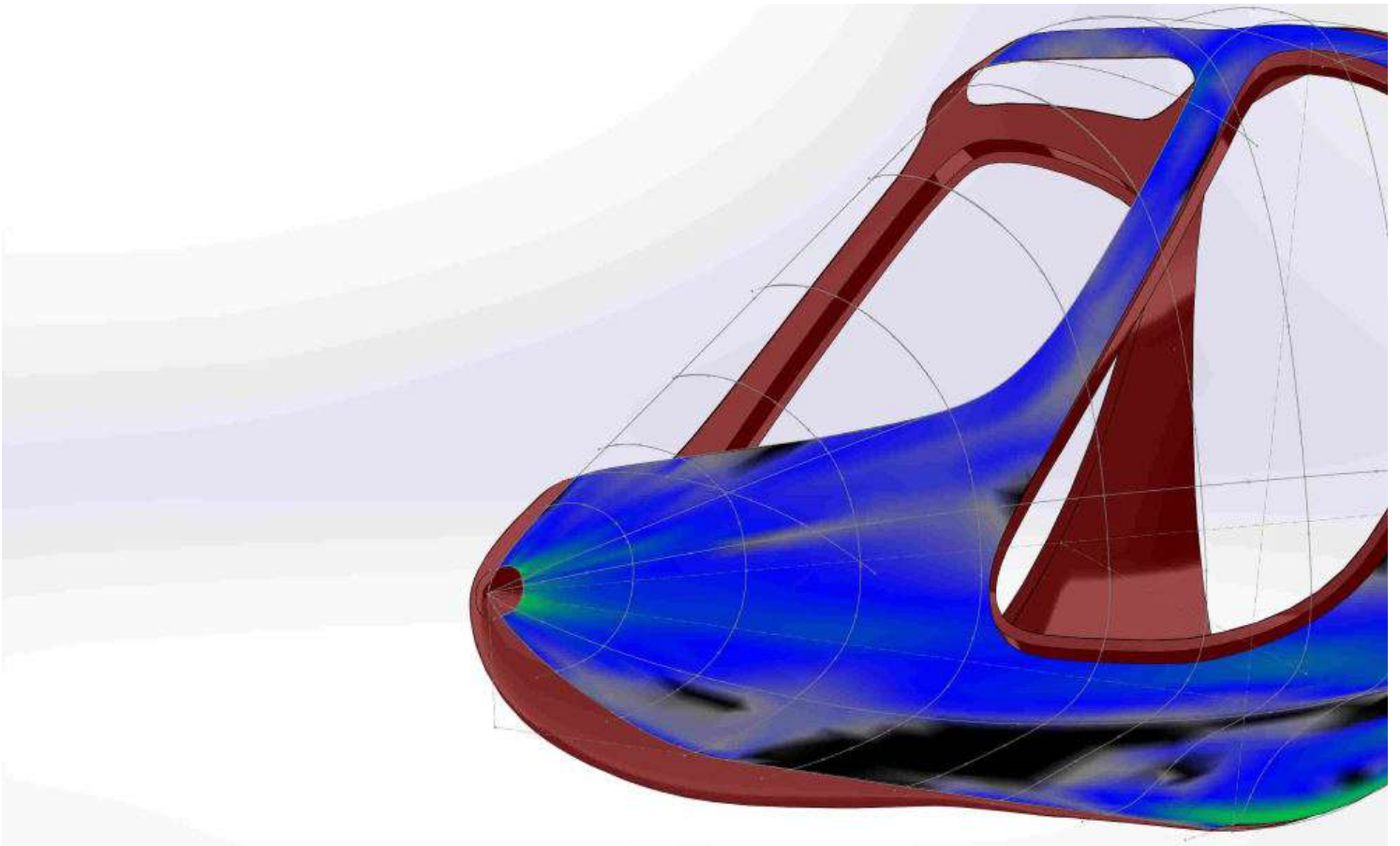
## Tooling plugs and molds for M2 pre-preg carbon-fiber body

The plugs are CNC-machined to tolerances of 10-30 thousandths of an inch.





laying up the carbon-fiber mold









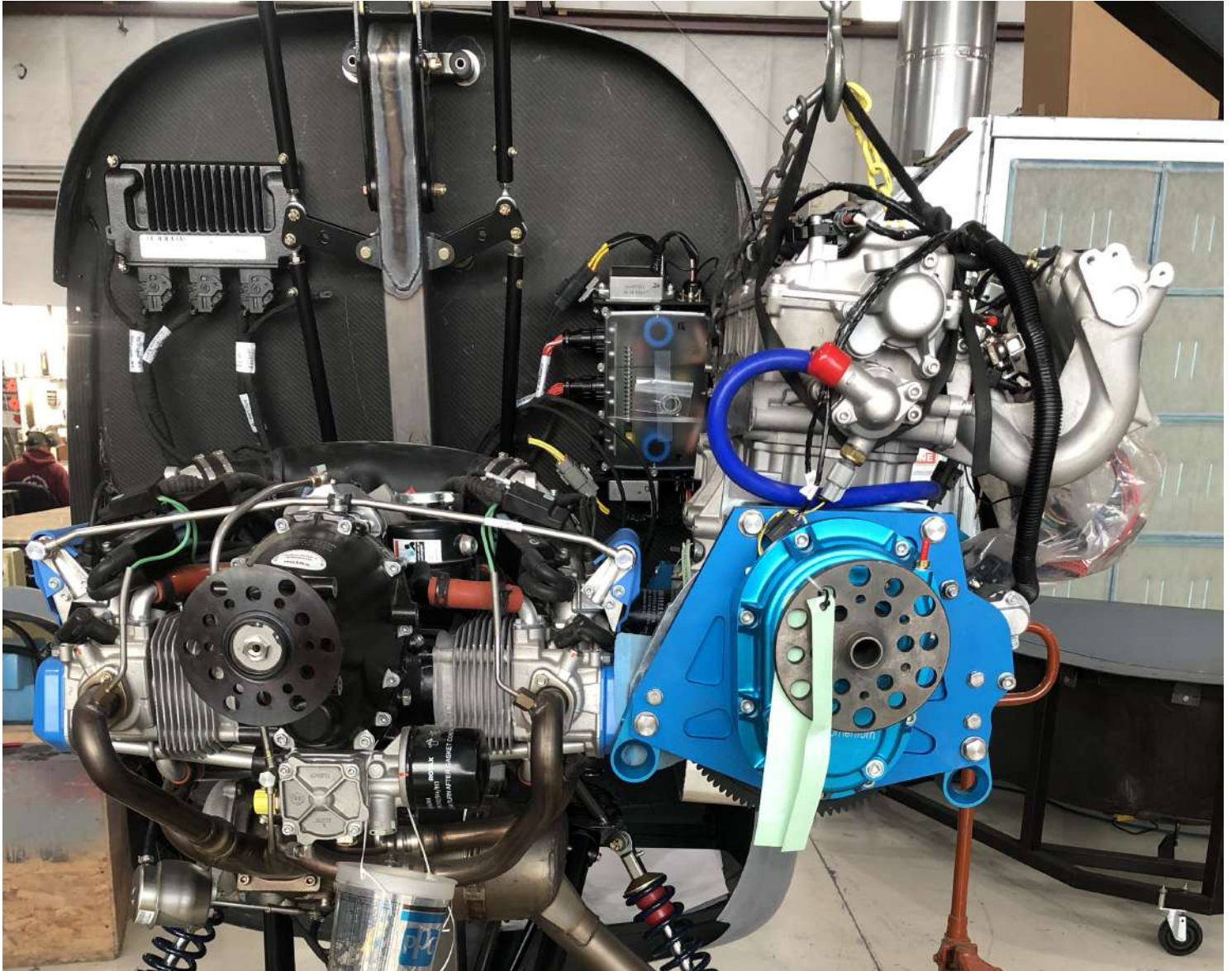






## AeroMomentum AM-15HP (131 hp @5800rpm)

Here is our first AM15-HP hoisted up to match prop height of the Rotax 915 iS.



### M2-AM engine mount

We've designed a very simple but strong bed mount. It's so strong, one could hang a Lycoming on it. We're already making the first one. We're also now building up the first M2-AM mast for the engine mount.

### AM15-HP thrust

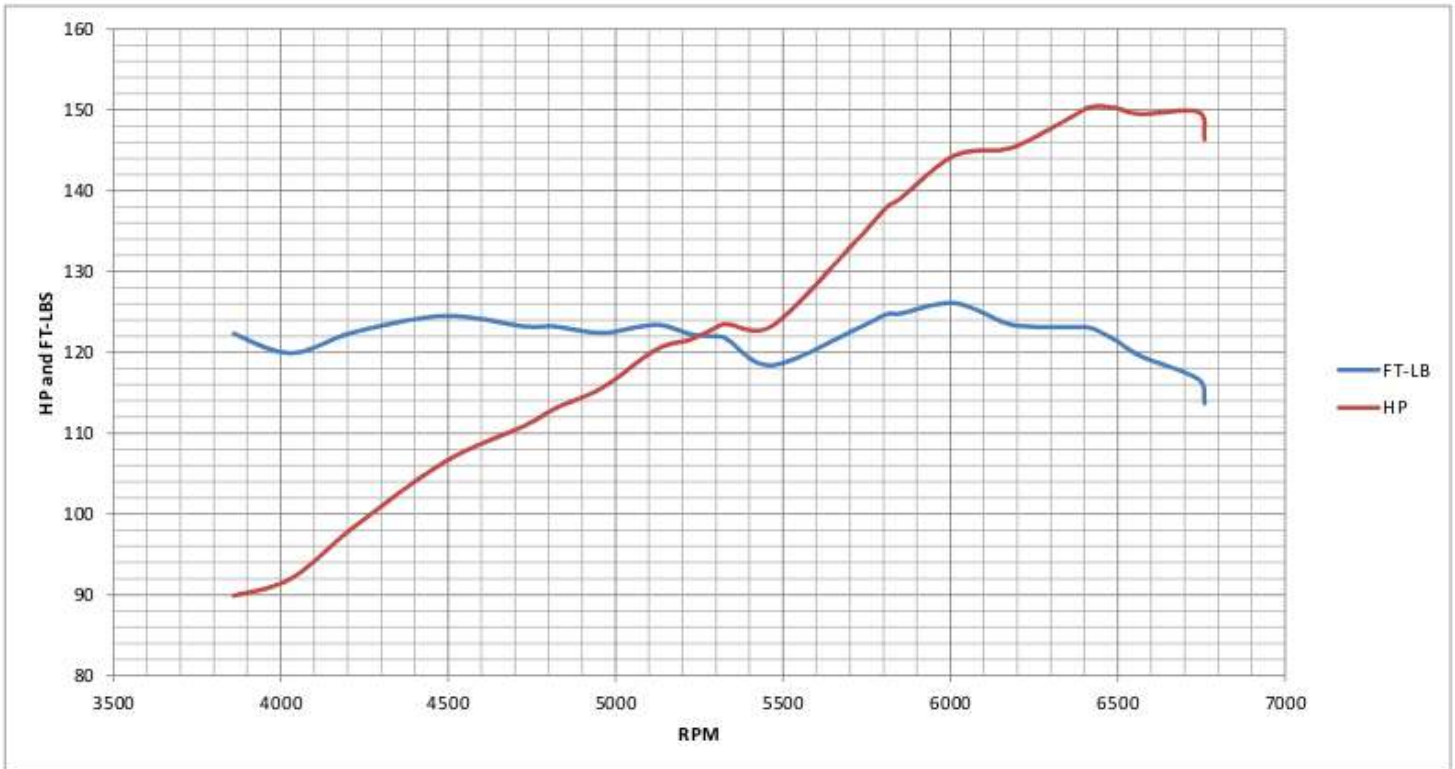
If the M2-AM empty weight is, say, 715 lbs, then we'll still have at least a 1:1 thrust-to-empty weight ratio (*i.e.*, exceeding that of our Vortex M912).

An estimate:           713 lbs @ 5800rpm  
                              800 lbs @ 6500rpm

The M2-AM will have the [140+hp Aeromomentum AM15-HP](#) engine (a dependable Suzuki water-cooled 4-cylinder 1.5 liter 16-valve SOHC with EFI and FADEC of comparable power:weight of the Rotax 915 iS for \$15,000+ less, and with a higher 1500 hour TBO and much less overhaul cost).

Although rated conservatively on the website, one engine gave 140.6hp @5840rpm, (continuous) which matches the Rotax 915iS of 141hp for 5 minutes at 5800rpm.

Weight is nearly identical between the two.





## Brakes for the first Sport Copter M2s!



The 2" brake caliper has 4x more pad area than our M912 1" caliper. Powerful!

Our new 2" caliper uses a Cessna pad, which you can order from Aircraft Spruce, etc. Notice the huge difference of the M2's 1¼" axle vs. our excellent M912 with ¾" axle. Like the SCII, the M2 wheel hubs have conical tapered bearings to better share the load.

The M2 axle and brakes are unlike any other gyro in its class. Aircraft robust, not for a toy.



## The Sport Copter M2 large Panel (optional)

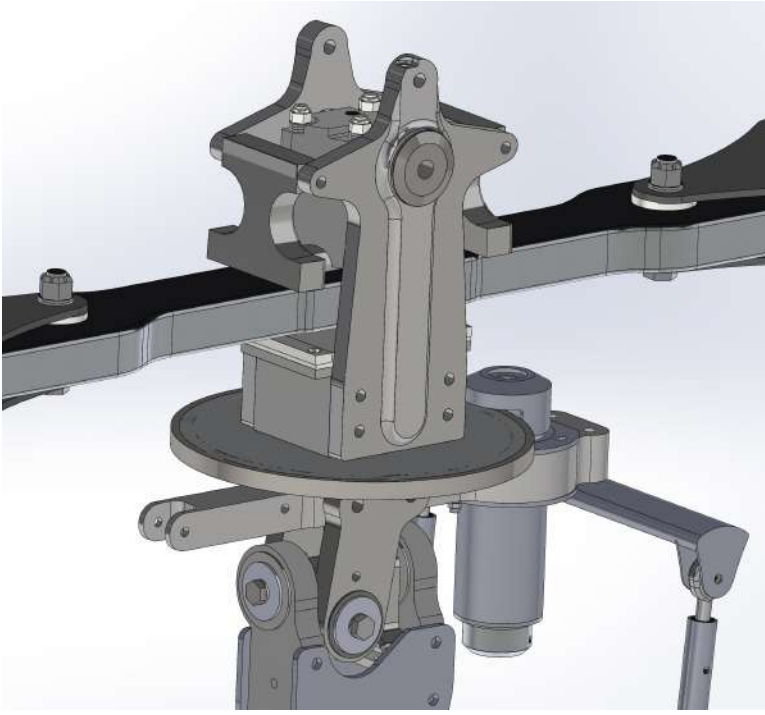


While the M2 may be ordered with smaller M912 panel, many customers require more space for nav and EFIS instrumentation. It will accept a 10.6" (270mm) glass screen and two airplane sized 1.65" (42mm) high stackable radio and transponder.

The panel comes with glare hood and screened venting cowl. It will be offered in a clear-coated polished finish as an option. We may design in a pilot's side lockable "glovebox".

The first large panel has been made, and placed for position. It's quite large but doesn't much interfere with visibility. The transparent chin bubbles are not blocked.





### **M2 rotorhead**

Since the M2 is the world's first rough-field 2-place gyro, we decided to beef up the rotorhead *everywhere*: with ½" teeter bolt, ¾" gimbal bolt, larger torque tube, massive teeter needle bearings. This rotorhead is more robust than what originally well served the 1750 lb. SCII!

### **M2 mast and torque tube**

We're very excited about our new design here, with the Bendix unit at 6 o'clock and the pitch air trim cylinder at 12 o'clock. This really cleans up the rotorhead, and allows for a nice upper mast fairing. The new gimbal arm has a original sleek shape.

**Success! First M2 Pre-preg Carbon-Fiber Rudder!**



## More robust than Aluminum!

All Sport Copter M2 pre-preg carbon-fiber tail pieces incorporate our new revolutionary V-Spar™ technology for unsurpassed strength, but also lighter than our competitors' common wet layup and foam-filled parts.

Much stronger for flight, and say good-bye to hangar rash! Here's a 213 pound (97 kilo) man standing on an unsupported rudder. Don't try *that* on a standard aluminum tail part.

Our carbon-fiber tail parts will be more efficient to produce with quality control than the aluminum, and we're now composing our manufacturing manual for the production line.



The yellow aluminum rudder is from the M912 to compare with a new M2 carbon-fiber rudder.

Weight is comparable per equal surface area.

Attachment points are nicely concealed top and bottom by external caps. No exposed bolts!



## First M2 Pre-preg Carbon-Fiber Tail!

Here are two 200 pound men standing on an unsupported horizontal stabilizer.  
Don't try that on any standard aluminum tail part.  
Our design team was amazed at the strength-to-weight ratio.



All Sport Copter M2 pre-preg carbon-fiber tail pieces incorporate our new revolutionary V-Spar™ technology for unsurpassed strength, while lighter than our competitors' common wet layup and foam-filled parts. Much stronger in flight, and virtually say good-bye to hangar rash!



The first tail was tufted and tested at many angles for high-speed loads.





## 2.5" Chrome-Moly 4130 round tail boom



Here is the first boom tubing in our weldment jig. 2½" .065" wall chrome-moly 4130 steel. Removable for storage or transport (and replaceable, if necessary), this round boom is of unequalled strength. **Why aren't other gyros built with structural steel such as 4130?** Because it's more expensive. Only one local firm could form it to our precise specs.



This boom and its carbon-fiber tail is fit for hard flying in gusty conditions, probably much more than most pilots could handle. Our goal for the M2 is to supply you the world's most rugged gyro — up to any difficult task.



## (Hanging) In the air for the first time!



With nearly all parts (but for rotor) onboard temporarily in their positions, we hung her to test preliminary weight and balance. We are well within our target range for empty weight! For balance, we confirmed our envisioned upper mast adjustment.

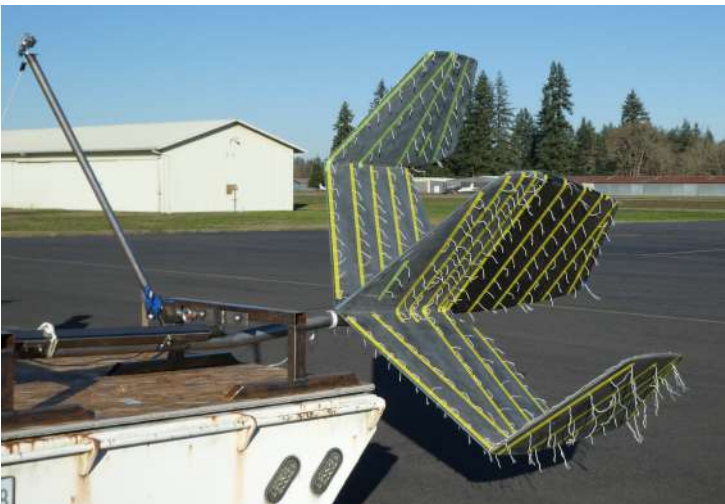


## Last trailering tests at high speed of the rugged M2 tail



Dramatic angles were tested up to 80 mph, to create as much air load as possible.

Over 500 lbs were typically recorded. The tail and its boom mount are very stout!







Between two “big brother” SCIIs, you can see how substantial the M2 is.









## Closing thoughts

The M2 as displayed at 2018 Oshkosh would have been a very good machine for your needs with an M912 tail, boom, and 2-bearing rotorhead (as in our RAF upgrade). We could have delivered that, but as we got more into the project we repeatedly saw how to make the M2 even better take paddock and pasture for thousands of hours.

Rough fields, hard flying — day after day, year after year. Your M2 will take it. The wait has been long, but we'll rejoice that it's been worth it. From all of us at Sport Copter, we thank you for your patience as we deliver you the world's most rugged 2-place gyroplane.



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