



Verticopter® : A new breed of STOVL aircraft

Verticopter® Newsletter from Garrow Aircraft

(4th Quarter 2008 issue, by Oliver Garrow)

Dear Verticopter® Community,

Happy New Year! First off thanks to all of you for your interest in the Verticopter® and support during 2008. As this newsletter is being sent out to more than **600 readers**, I am taking the liberty now to call this group a “community”.

2008 was an exciting year that marked the debut of Verticopter® in June to an enthusiastic response in the general aviation community. This led to more experts joining our team and **four design revisions** of the first prototype in the following six months. The Verticopter® has received much attention in the press as well. **Eleven articles** were published after its launch by various trade and general news agencies worldwide. (*You can find the links at: http://verticopter.com/news/verticopter_online_articles.php*). In November, the **Discovery Channel Canada** sent a production crew to our headquarters in California to film a test flight of Verticopter® for its popular show, “**The Daily Planet**”. The segment, which aired on November 20th, can be viewed through a link at our website.

The level of interest in the Verticopter® project remained high as our small team kept improving the original design of release 1.0 through to release 1.4, which is the latest design database refined with numerous enhancements. For the 1.4 release, we were fortunate to have help and expertise from **12 beta-testers**, who come mostly from the professional general aviation community. Amongst them, I would like to especially thank **Mark Sumich, Brad Betters, Mike Shea, Dave Kester, Danny Husk, Hermann Lehmann, John C., John Pugh, and Ed Slawson** for their considerable contributions to debugging Version 1.4. Special thanks also to our Chief Designer, **Dan Klaue**, to our Webmaster, **Ela Klaue** and to **Joe Perfecto**, professional photographer, to whom we owe some outstanding photos taken at the AMES runway. A quick note here to remind that all the contents of this newsletter is copyrighted **Garrow Aircraft 2008** (and the runway pictures are copyrighted **Joe Perfecto 2008**)

Our X-plane Simulator continues to grow in popularity, and I am pleased to report that our pool of licensees is nearing **400**. Please note that all Legacy customers are entitled to a free upgrade to version 1.4. (*Information on how to get this upgrade is included below in this letter*)¹. Another positive indicator of the project’s popularity has been the web traffic to **verticopter.com** which has surpassed **17,000 unique visits** in six months. This translates to one new visitor every 15 minutes on average. Again, thanks for spreading the word.

This is our second quarterly Newsletter issue reporting the latest and greatest about Q4-08 Verticopter® developments. You can also read the previous newsletter (Q3-08) at:

http://www.verticopter.com/bizc/Verticopter%20Newsletter%201_Q3_2008.pdf

Now onto the news about our newest developments and plans for the next stages of Verticopter® in 2009 and beyond.

Here is the agenda in this issue :

1. [Verticopter® positioning](#)
2. [Markets update](#)
3. [Development and Engineering update](#)
4. [Simulator upgrades](#)
5. [R/C Production plans and Builder Contest](#)
6. [Communication and Legal updates \(new video tutorial !!\)](#)
7. [Wrap-up](#)

We quickly determined that a flying wing with a “plank type” conformation, as in the earliest version of Verticopter[®], does not have the best stability and requires several refinements. This was shown in the first R/C prototype, “**Proto #1**”. Through more than **100 iterations**, we introduced canards, tapered wings, wing dihedral, winglets and speed brakes as incremental improvements. Each consecutive version of X-plane simulator model helped us verify and quantify the improvements for those flight characteristics. It would be too long to list all the enhancements in this letter, so please refer to the seven-seater release notes for more information:

<http://forums.x-plane.org/index.php?autocom=downloads&showfile=6720>

NEW 7-SEATER IN VERSION 1.4



The drone and R/C products were also largely revisited, with a focus on exactly replicating the manned versions by implementing new wing and winglet designs. Also, for better flight performance in the R/C world (i.e. at lower Reynolds Numbers), the 1:10 and 1:5 scales received a new airfoil (with an increase of camber and **thickness from 12% to 16%**) which immediately boosted performance. You can read the entire list of updates for the R/C and UAV models at: <http://forums.x-plane.org/index.php?autocom=downloads&showfile=6735>

All in all, the five scales of version 1.4 required **200 hours of redesign effort** and were beta-tested by a team of **12 people for more than 300 hours total!!** We were proud to launch Version 1.4 and consider it our best and most thoroughly-tested version ever. This could not have happened without the time and support from our beta-tester team members, each of whom brought each their unique expertise to this team. Hats off again to this hard-working and talented team!

At this time, I would like to introduce a new member of our team, **Brad Betters** from **Betters Engineering Group, LLC**. Many thanks go out to Brad, who brings invaluable expertise and consultancy services. Brad’s deep GA experience, both as a CFII and aircraft designer, helped organize our engineering activities with a new global engineering site that enables us to keep in touch with our international base of beta-testers. This new tool is located at <http://www.bettersllc.com/e107/news.php>. Through this new site, we can now facilitate 24/7 global engineering activity through interaction with team members located in the Pacific Rim, Australia, North America and Europe.

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4. Simulator Upgrade for X-Plane 9

With the release of the 1.4 design database, all five scales (200%, 100%, 50%, 20% and 10%) were revamped and mirrored. There were also optimized to work with X-Plane current's version **9.21**. If you are new to the Verticopter® or to X-Plane, I strongly advise you to upgrade, whether you have a licensed copy of X-Plane or the evaluation version. Please note that VC 1.4 is not compatible with XP 9.00

To the traditional three flavors available in version 1.3 (two-seater, seven-seater and XP Pack) we added a package called "**UAV/RC Pack**" that features the 50%-scaled drone and the 2 R/Cs (1/5 and 1/10) in one "unmanned Verticopter®" pack. Also, you may have noticed a slight increase in pricing (25%), but quite justified by the new quality level and after the extended work version 1.4 required.

If you are a new sim pilot, you can purchase the sim license and get the download instructions from our distributor at : <http://store01.prostores.com/servlet/x-planestore/Categories?category=Verticopter>

If you are a legacy customer who has not yet received the automatic notification to upgrade for free to version 1.4, please contact Dan at: support@verticopter.com

Also, we have a new upgrade option: if you are a single-plane pilot (two-seater or seven-seater) and you wish to upgrade to the XP-pack and discover any of the other 4 planes, you will pay just the price difference of \$10. Please contact Dan at: support@verticopter.com who can explain the **XP Pack upgrade instructions**.

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5. R/C Production Plans and Builder Contest

Our most exciting news comes from the latest test-flights of our Proof-of-Concept UAV (POC), which were conducted at the **NASA Ames site in Moffett Field, California**.

Here is a snap short as the **POC** travels at 50mph during a fly-by in STOVL mode (**vector angle at ~55 degrees**):



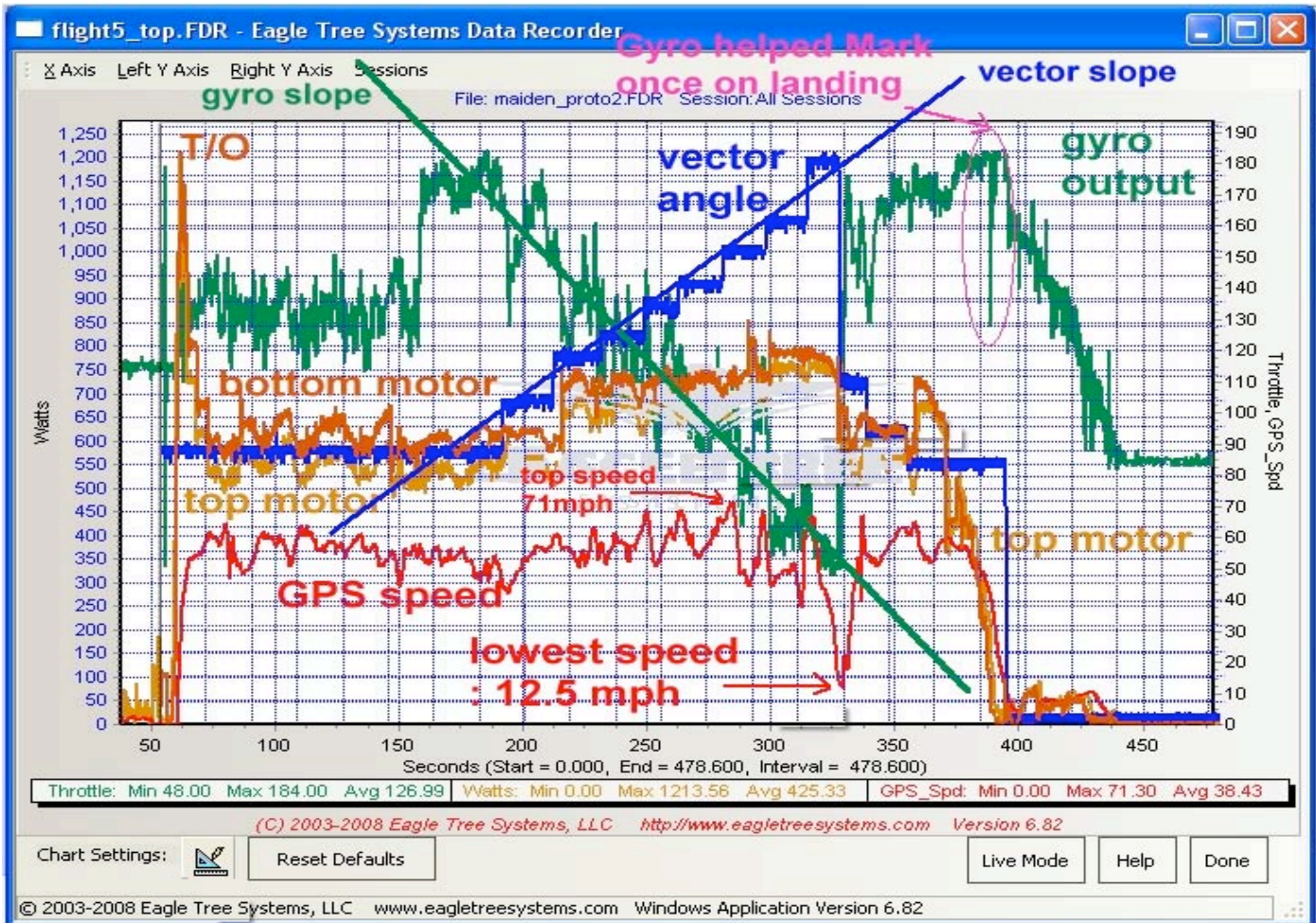
The R/C version at the 1:6 scale (50-inch wingspan) is based on our internal database release No. 27. It has a basic platform (square plank) but has proven very useful as a test bed. That simple configuration was selected to be the original platform and was relatively easy to build with a constant cord wing. Also, it offers enough interior space for extra onboard electronics, which has made it a nice platform for experimentations and data collection.

Although this POC has a rudimentary look and design (constant-cord wing, inverted VTAIL opposed to arched tail, etc.), it actually re-uses most of the Verticopter® patented techniques. It even has an air-retractable landing gear, although we have disabled that feature temporarily in order to pack test electronics into the wheel bays. So far we have logged **five successful flights in two months** that have provided precious flight data.

The all-electric POC holds the following:

1. one large NiMH 7-volt battery
2. four 3-cell 3700mAh LiPo batteries (25C)
3. two 2,200w capable 3-phase motors
4. two 85A capable ESC
5. two 100A capable power data loggers, one per engine
6. one 5-hz GPS receiver and logger
7. one pitch-hold gyro
8. one 2.4Ghz FASST receiver with 7 servos (3 pitch and roll, 1 rudder, 1 thrust vector, 1 air retract, 1 nose gear)
9. two MPEG4 VGA video recorders

Here is typical output from the two data loggers:



Test flight number 6 is scheduled for early January 2009, where we will continue to expand the flight envelope towards low-speed operation and STOVL. Progress with this POC has been slower than expected, as it has not demonstrated the same stability as the production release (V1.4), which has now optimum characteristics in three-axis stability. Enhanced control was achieved by adding a gyro for a pitch-hold function.

R/C Builder Contest

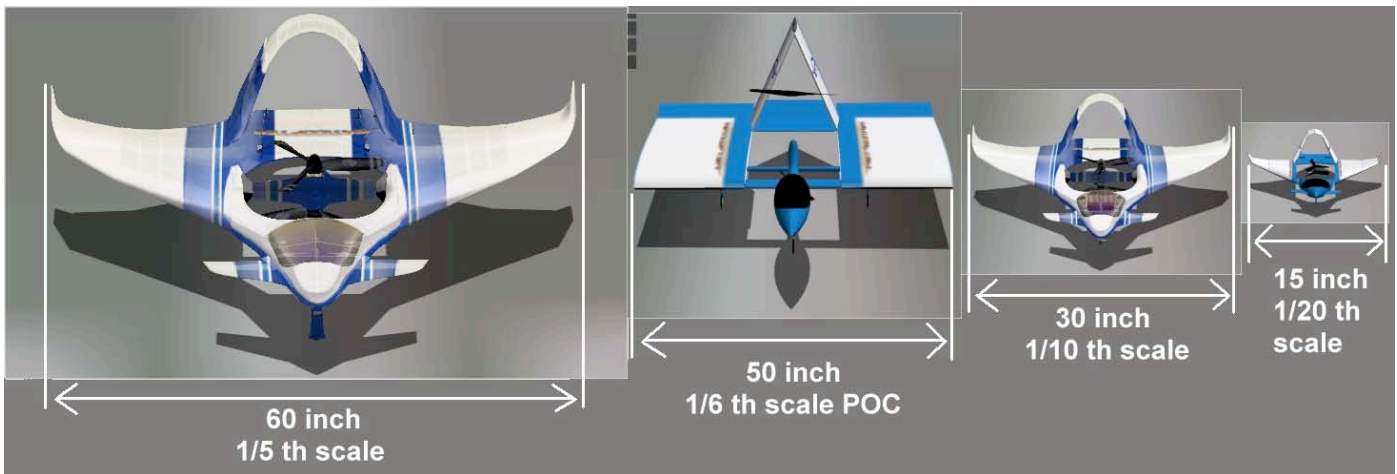
Since we are manpower limited, I have decided to open a new contest, the “**R/C Builder Contest**”, to speed up the manufacturing of the production UAV. Effective immediately, we invite any and all skilled R/C builders to help us manufacture R/C and UAV prototypes based on production database 1.4. This VC family is very scalable and already has yielded three different R/C scales: 1/20, 1/10 and 1/5.

While Garrow Aircraft will prototype the 1/20 version, we will offer to the VC community a couple of builder licenses to assemble several planes in 1/10 and 1/5 scales. Each model of this scale serves a different market:

1. 1/20 serves the toy market; wingspan is around 15 inch, weight around 1/3 lb
2. 1/10 serves the small R/C market; wingspan is around 30 inch, weight around three lbs + payload
3. 1/5 serves the large R/C market; wingspan is around 60 inch, weight around ten lbs + payload

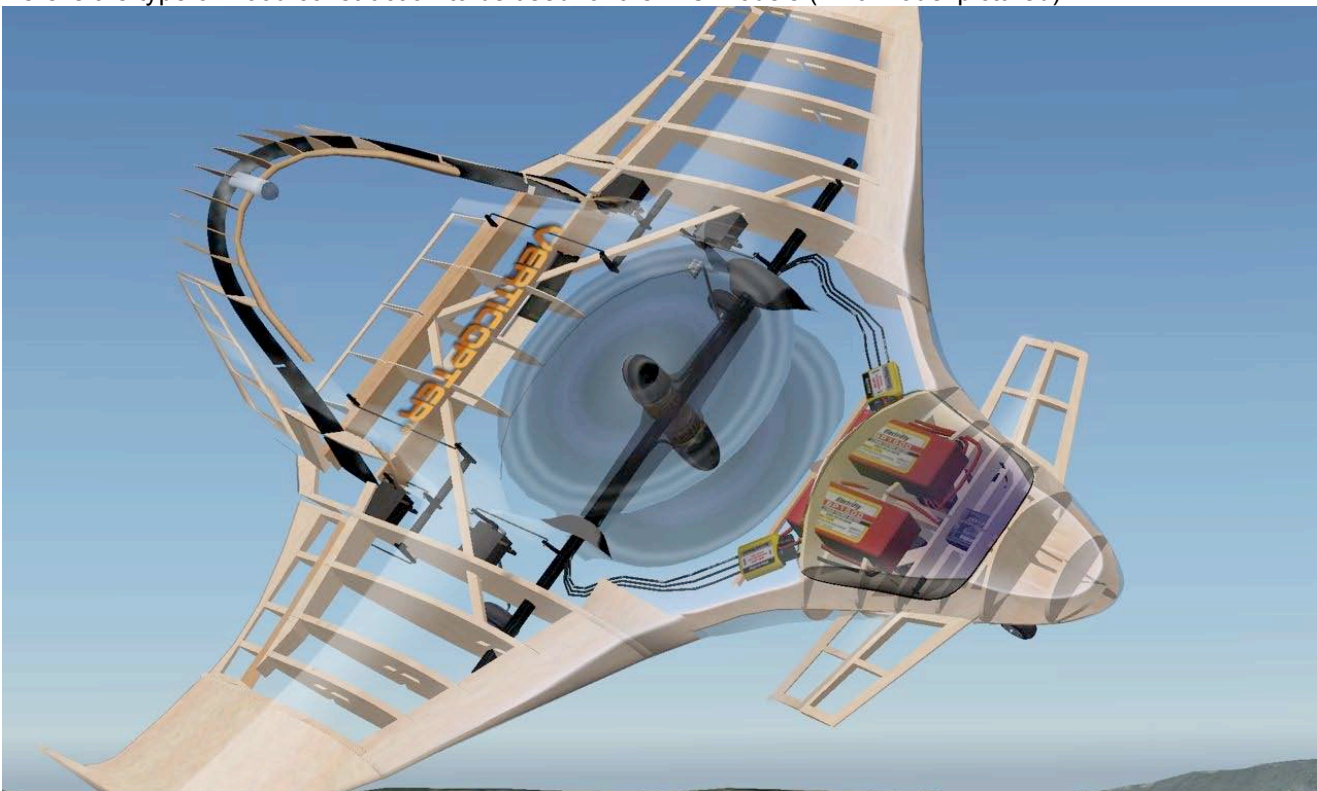
R/C Scale comparison :

Here is a simple comparison of the three R/C products (1/5 , 1/10 and 1/20 scale) and the POC UAV (1/6 scale)



The 1/5 and 1/10 will use traditional wood assembly and Monokote, the 1/20 will be made of injected foam and the 1/6 POC uses Kevlar composites.

Here is the type of wood construction to be used for the R/C models (1/10 model pictured):



How to Apply, Rules and Winners of the R/C Builder Contest :

1. **The application period begins January 2009 and ends February 08, 2009:** You may send your applications to rcsupport@verticopter.com . Your application should include:
 - a. data and pictures of your previous R/C projects, those being wood and monokote based;
 - b. your resume as an R/C builder, listing any special skills and motivations;
 - c. the scale of interest (1/5 or 1/10), and
 - d. the time frame in which you think you can complete the first plane.
2. **Selection Period begins February, 2009:** A few builders will be selected to take part in the contest and build one R/C model. Each builder will receive a manufacturing license and the building plans for a single model.

Selected builders will receive a plan for all the parts, calling for regular R/C assembly techniques, wood and Monokote, so special tool or composite work may be needed.
3. **Manufacturing period runs through May 2009:** Builders will be asked to discuss their progress through our [TCMS](#) engineering web site, most likely on a weekly basis, and will receive on-going support from the Garrow Aircraft team.
4. **Awards Given Out (June 2009):** At the end of the manufacturing period and after **successful test flights**, each project will be reviewed and ranked. The two winning builders (one winner per scale) will receive a monetary award: **\$300 (USD) for the 1/10 and \$500 (USD) for the 1/5** (for a plane with two installed motors and props) in exchange for their prototype and will receive a **new manufacturing license** to build another model for them to keep. Garrow Aircraft will pay for the shipping and handling of the winning models.

This contest is open to anyone, regardless of age, profession, or location. We appreciate your participation. Please feel free to contact us at rcsupport@verticopter.com if you have any questions or concerns about this contest.

About the Livery Design Contest :

Just a quick reminder that we also are offering a similar contest to format paint jobs in the simulator and to create your own liveries. You may check out the rules for this contest and submit your creations at:

<http://verticopter.com/media/pictures/liveries.php>

(This is also the link where you can receive free additional livery packages for your current X-Plane package)

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6. Communications and Legal Updates

New video tutorial

Dan, who is also a sound engineer and video producer, has very kindly put together a very detailed video tutorial. His **17-minute** two-part video clip describes thoroughly VC technology and piloting techniques.

I strongly recommend this all-you-need-to-know guide for new VC pilots.

Here are the youtube links that you should view in high-definition mode:

<http://www.youtube.com/watch?v=-c5Gz1-W-UQ>

<http://www.youtube.com/watch?v=QycSMzy7oTs>

Discovery Channel Segment

On November 9, 2008, we hosted a TV production crew from **Discovery Channel Canada** who spent the day with us. They attended our morning test flight session at AMES for flight four. Then they came to film our workshop area in the afternoon. Altogether, they spent close to eight hours shooting this segment for their popular show, "**The Daily Planet**".

Test pilot Mark Sumich and I were both interviewed on camera. They also took footage of us running the test flight. It was an interesting experience for us who are more comfortable behind the camera lenses than in front of them. In the end, it was a productive day and test flight. The segment originally aired on November 20, 2008, but we are streaming it on our website at: http://verticopter.com/media/videos/disc_clips/vc_on_discoveryla.html



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Test Flight preparation on the runway at Moffett Field. At photo center, the Discovery crew set up their HD CAM

Canadian readers, you can probably catch replays of that **Daily Planet** show on Discovery Channel. Look for this logo:



Legal update

Since we believe the Verticopter® uses a unique technology, we have duly filed several patents for it. So far, we have filed for **four patents in three jurisdictions**, and **one has been already granted**. If you are interested, or know someone who could be interested, in licensing the Verticopter design, please contact me and I will forward your inquiry to our legal counsel.

You may have noticed that the word **Verticopter®** is now a “brand”, or **registered trademark** that was granted by the USPTO. Since that grant, we have had to replace the Verticopter™ logo with Verticopter® on the all plane’s liveries and on our website too.

Garrow Aircraft has always been diligent about IP topics in order to protect current and future customers.

Upcoming Projects

Aside from the R/C projects (1/5 and 1/10 scale) which should go to production in 2009, we expect yet another R/C implementation, at the 1/20 scale, to be fully licensed by the middle of 2009. The licensee is a large Hong Kong-based toy maker that aims to have this toy version in stores by Spring 2010. Besides the toy and hobby applications, we are also positioning our company to manufacture large UAVs with various payloads. This activity, however, is contingent upon closing our first round of funding.

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7. Wrap-up

Thanks for taking the time to catch up with us. As always, the Garrow Aircraft team will be delighted to receive your input, comments, request for enhancements, etc. You may reach us at the following addresses:

Technical and Sim support: support@verticopter.com

R/C program support: rcsupport@verticopter.com

Sales support: sales@verticopter.com

Inquiries: inquiries@verticopter.com

Web support: webmaster@verticopter.com

Founder and President: oliver@verticopter.com

For any other topic, please use our general website: <http://www.verticopter.com/contactus.php>

The next Newsletter is scheduled for release around April 2009. In the meantime, I hope to share new results with you about our POC via our Blog at <http://verticopter.blogspot.com/>

Thanks again for your support and interest.

My best wishes for 2009 and safe flying (with the Verticopter®) !

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USA

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<http://verticopter.com/mailling.php>