EL TORBELLINO

NEWSLETTER OF SAN DIEGO ORBITEERS FREE FLIGHT CLUB

APRIL 2020

Prez's Corner – Mark Chomyn

If you read last month's Prez's Corner you might have gotten the idea that I was excited about the flying events that were to occur in March. I had several of my models trimmed ahead of time (a rarity) and felt that I was ready to compete and maybe even place in an event. Then, the crap hit the fan. First it was weather. The beginning of another "Miracle March" weather system that has now taken us into a wet April.

But that wasn't the end of the bad news. No, we next had to deal with a thing called Coronavirus (COVID-19). Initially there was some discussion as to whether this was just another flu or something new that we really needed to be wary of. As more news came in from China and Italy it became clearer that this was no routine seasonal flu bug, but a new virulent strain for which the medical community had no known inoculation antidote. So, the social distancing, sequestering and mask wearing began. And, as a 70-year old person, I was being told it could have increased consequences due to my age. Okay, go out only for absolute necessities (food, meds, bank, USPS) and stay home.

The results of this for many is that sequestering has led to the closing of swimming pools, ball fields, tennis and basketball courts, beaches, bowling alleys etc. For those hobbies/sports, the people affected have no "Plan B". That is, the bowler isn't likely to make a bowling ball while holed up at home. The tennis player isn't like to construct a racket. The basketball player won't build a new ball. But we free flight flyers are lucky to have a two-phase hobby/sport. That is, we build (Phase 1) what we fly and compete (Phase 2) in our hobby/sport with what we build. So, if you're like me, "Plan B" or Phase 1 goes into action in the garage. Get the plans and wood out and go into the building mode with a passion. If like me you're also in Plan B (Phase 1) right now and you may feel as I do…."**IF I DIDN'T HAVE THIS HOBBY/SPORT TO LEAN ON I'D BE GOING NUTS!"**

Sequestering has allowed me to complete a new Winter Hawk II Coupe. I've got a new Comet Hellcat on the building board to fill the void (WWII Mass Launch) in my fleet, replacing the old Hellcat which I spiraled in at Perris several years ago. And, I continue to pursue the "build something different mode" with a classic I purchased from the late 50's early 60's.

Those of you who were "plane crazy" as a boy may remember the light vacuum formed plastic flying models created by Strombecker in 50's and 60's. I recall building the Spirit of St. Louis and the low wing Ryan Trainer. Neither plane flew very well but I was able to put them together and achieve some

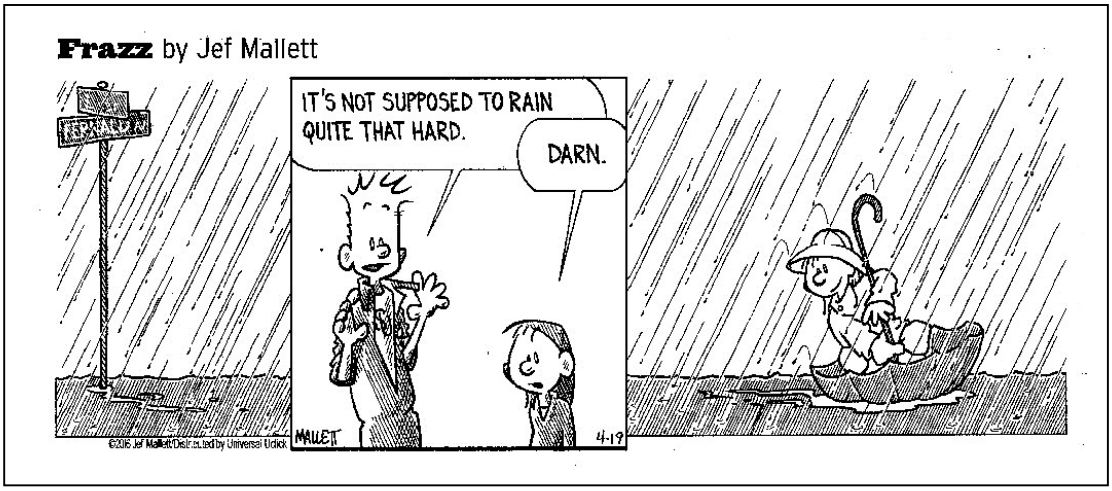
horribly short flights. At the same time Strombecker was producing their kits, the Lindberg company also produced their own line of vacuum formed flyers. I recently ran across one (the Cadet) on eBay for $20 and just had to have it. So, I bought it. When it arrived, I was floored. It was in an original, pristine and unopened box. I stared at the brightly colored graphics on the box for days struggling with whether I should open the box and build it or keep it as is and just display it. My adolescent urges got the best of me and I opened the end flap and took out the contents. The parts had a great multi-color trim scheme and a rather respectable wing span of 18-inches. The only down side was, though the kit was unopened, it did not include the landing gear wire. I wasn't too bummed about it even though the gear wire had an unusual configuration and my initial reaction was that (with some curves and tight bends) it was going to be difficult to bend it to fit well. But, bend I will and I will get it done. The only other problem was that I did not have any plastic cement and the stores that did have it were closed because of…. you guessed it, COVID-19. So, I may do an online glue purchase rather than wait for the sequestering to end.

Hope that all of you and your families are healthy and holding up under these unusual conditions. Every time you get the chance don't forget to thank those (grocery store workers, medical staff, postal workers, pharmacy workers, police, fire etc.) who are working during this crisis to provide for our needs. One thing I promise, I will never complain about the mulch piles at the Perris field again. In fact, I wouldn't mind being at the field right now and slogging through them to retrieve a plane. Things will get better. We'll be back at the field and there will be thermals. As you know, the club has suspended all flying activities until the all clear is issued by the powers that be. When the all clear is issued, the club will send out a notice to all about the resumption of our flying activities. To all of you, please heed the advice of the medical community and stay at home to the greatest extent possible and stay safe and healthy. See you at the field.

Mark

"You start with a bag full of luck and an empty bag of experience. The trick is to fill the bag of experience before you empty the bag of luck."

From that great philosopher – Anonymous



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THE FINE PRINT THE FINE PRINT

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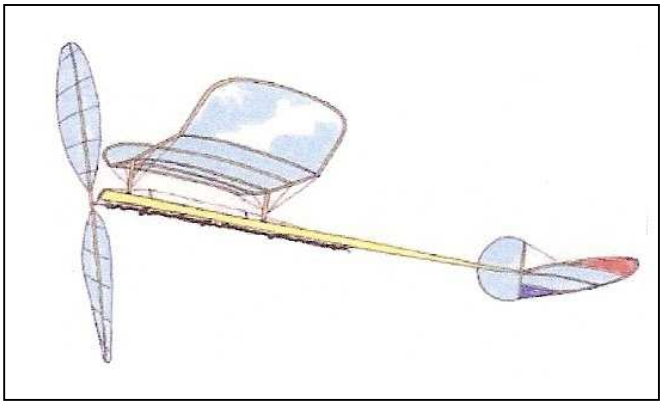
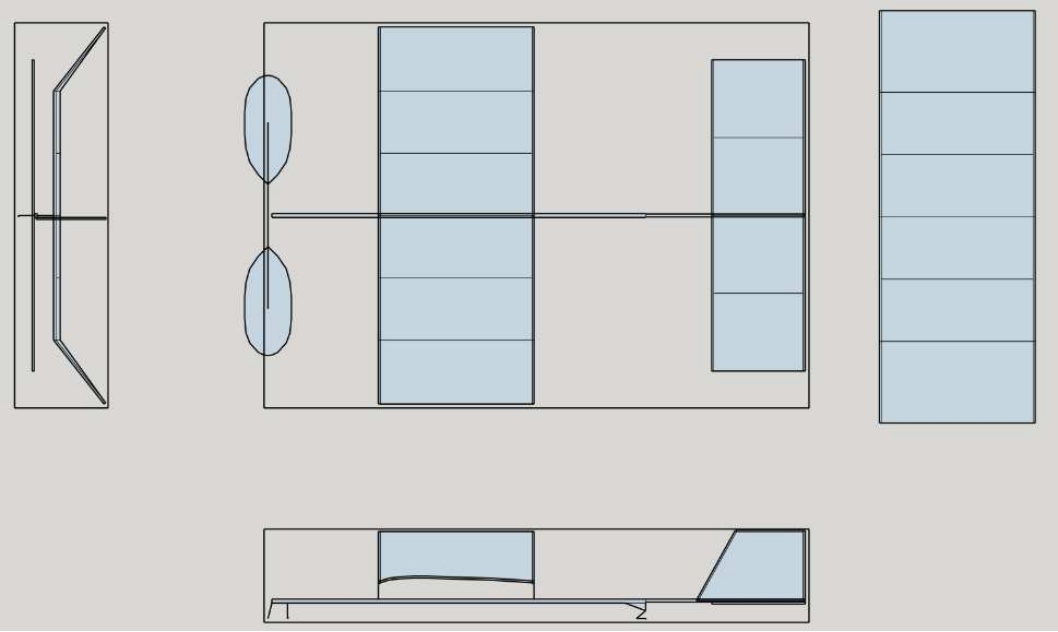


Science Olympiad "Wrong" Stuff
By Mike Jester

Many of you are probably familiar with Science Olympiad (SO). It is a nationwide competition at regional, state and national levels that seeks to promote STEM education among elementary, middle, and high school students. It started in the 1990's and every year has a few hundred thousand participants. There are about 17 testing events and about 6 building events each year in the competition. Teams of 15 students cover the 23 events and are ranked by the total of their scores in all 23 events. I coached all the (SO) flying events for the Francis Parker School in San Diego for 15 years. San Diego is one of the most competitive SO regions in the country. The flying events include Bottle Rocket, Elastic Launched Glider (similar to CLG), rubber powered Helicopters, and Wright Stuff airplanes (WS). Each flying event is normally held for two consecutive years and the three aircraft flying events are rotated.

WS is an event in which students build and fly indoor rubber powered stick model airplanes similar to those of the AMA P-18 event. The allowable maximum wing and stab dimensions, maximum rubber motor weight, and minimum model weight are varied each WS season to prevent students from handing down their airplanes. In San Diego, at the high school level, there are typically around 60 WS teams. Winning WS flight times in a typical high school gym in the San Diego regional SO competition are often over three minutes.

I eventually grew tired of seeing that 90-95% of the WS airplanes flown were cookie-cutter airplanes built from the lone WS kit manufacturer, Freedom Flight Models (FFM). In 2017, my daughter (a gold medalist in WS several times) and I wrote a set of rules for an SO trial event called Rubber Powered Airplane (RPA). The RPA rules are reprinted in this newsletter. Reproduced below is a design of an RPA airplane drawn by Joshua Finn, of J & H Aerospace.

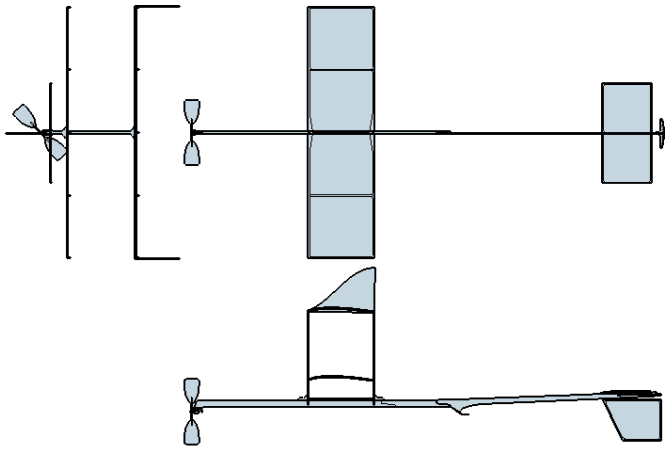


RPA Design by Joshua Finn

Under the RPA rules the rubber powered airplane has to fit within a standard “FedEx Large” cardboard shipping box in a ready-to-fly condition (less prop) and weigh at least 5 grams. The interior of that box measures 12-3/8 x 3 x 17-1/2 inches. This form factor rule of the RPA event encourages experimentation in design, makes judging easy at check-in, and results in a safe transport carrier. There are no limits on the size of the prop or the weight of the rubber motor under the RPA rules. There is little doubt that the national SO organization could get permission in advance from the FedEx corporation for SO students to obtain and use the large FedEx boxes for free. They are readily available at hundreds of FedEx outlets across the country. Imagine the free advertising for FedEx! Most major corporations support STEM education.

As the Event Supervisor, I ran RPA as a successful trial event at the SoCal State SO finals held at Caltech in Pasadena, California, in 2017. I suggested to the powers-that-be that they rename RPA as Wright Stuff to continue their long tradition of using that name for their rubber powered airplane event. The flying events committee of the national SO organization rejected the RPA event. A long-time member of that committee made it very clear that SO has no interest in supporting free flight, and AMA participation, in particular.

The main excuse I was given by a member of the committee for not adopting the RPA event was as follows. Due to tolerance variations in the size of a FedEx large box a student’s plane might not fit in either of the official boxes provided by the Event Supervisor at check-in. I then suggested a slight amendment to the RPA rules that stipulates that students can bring their own airplanes to the competition inside their own FedEx boxes. These airplanes would be legal as long as there were no apparent alterations to the physical size of the boxes. Realistically, several millimeters difference in the size of the boxes between competitors would have little, if any, impact on the outcome of the RPA competitions. No response was ever received by me regarding this minor fix. It is very clear to me that “not invented here” (NIH) is the guiding principal of the national SO flying events committee. Eventually, students got stuck with absurd rules for the WS 2020 event which limit the prop to a maximum diameter of only 8 cm and a tiny stab of only 12 cm x 6 cm. The wing span is limited to 30 cm x 8 cm. The minimum airplane weight is 8 grams. A WS 2020 biplane design by Joshua Finn is shown below.



WS 2020 Biplane Model from the J & H Aerospace kit

The WS 2020 rules dictate an inherently unstable model that, with rare exceptions, can only be optimally trimmed with the assistance of an expert. I know Joshua Finn personally. He and his wife Hope are the proprietors of J & H Aerospace which produces and sells many different indoor free flight kits and accessories. Josh is an extremely accomplished indoor and outdoor free flight builder, designer and flier. The J & H Aerospace kits are excellent. But you can appreciate from the image of his WS 2020 design that the stab is too small, but it is as big as the rules allow. The 8 cm diameter prop is ridiculously small. But again, that is the biggest prop that the WS 2020 rules allow. In total there were five different commercial WS 2020 kits. No doubt each kit model suffers from the same instability issues due to the odd proportions of the flight surfaces and the tiny prop.

In my opinion the instability and trimming difficulties of a WS 2020 airplane are due to the following. The stab is relatively small so it is difficult to achieve a reasonable static margin of stability without a very long tail moment. The cut-down Ikara prop is so lightweight, and the tail feathers are so far rearward, that the wing(s) have to be moved very far rearward from the nose in order get the CG in a reasonable location. In order to get a motor run over 60 seconds with such a tiny prop, the motor stick has to be relatively long to accommodate a rubber loop of 30+ inches. There is no limit to the weight of the rubber motor under the WS 2020 rules. Combining all these factors, the resulting very long nose and tail moments and the relatively small wing span make the airplane very challenging in terms of maintaining pitch, roll, and yaw stability. During flight, the stab can move out of the very narrow slip stream of the tiny prop, resulting in significant de-stabilization of the model. These problems are compounded when trying to adjust the airplane so that it orbits in opposite directions during consecutive flights. Under the WS 2020 rules, during competition if the same airplane completes at least one full circle in opposite directions on its two official flights, then your base score is the total of your two flight times. Otherwise your base score is the higher of your two official flight times. Successfully accomplishing the bonus requires a very difficult and precise adjustment of rudder and wing wash-in between two official flights in an 8-minute Flight Period. The bonus of circling in opposite directions only adds more frustration for the students.

The WS 2020 rules allow a biplane. Many students do not appreciate that this only complicates making the minimum airplane weight of 8 grams and makes trimming more difficult with no real advantage in flight times. A biplane with two identical wings does not produce twice the lift of a monoplane with only one wing of the same size. There is aerodynamic interference between the low-pressure air above the lower wing and the high-pressure air below the upper wing. Add in the extra drag of the second wing and you are better off just flying a monoplane and avoiding the extra weight and trimming difficulties resulting from two overlapping wings. However, many students are irresistibly drawn to the “cool factor” of a biplane.

Most WS 2020 airplanes flown in competition use the 6-inch (15 cm) diameter Ikara prop cut down to 8 cm in diameter. Obviously, that produces a prop with less than optimum pitch and blade plan form. This prop has an injection molded plastic spar and plastic film blades glued to the same. I understand that breakage of the cut-down Ikara props was a persistent problem for many teams during the WS 2020 season. One seasoned WS coach has opined that this is probably due to the fact that the 8 cm prop spins at approximately 2,400 RPM!

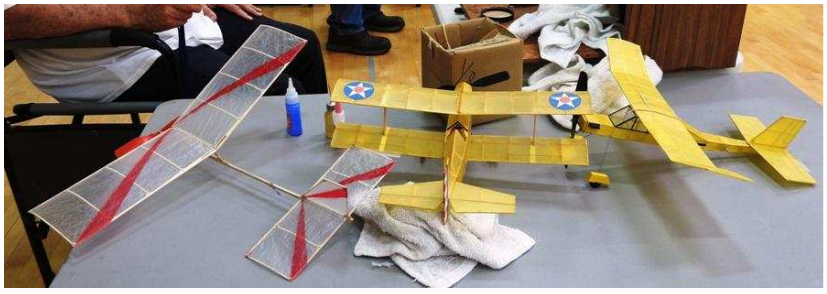
This year at the Grossmont gym I tried to help two Scripps Ranch High School students who were trying to trim their WS 2020 models built from the kit sold by FFM. We finally got one of them to fly in a left-hand circle pattern for about 45 seconds. This model airplane was very unstable and extremely challenging to trim. The foregoing difficulties are why I refer to the WS 2020 event as “Wrong” Stuff. If the national SO organization wants to limit flight times in WS, it should just raise the minimum weight of the model. However, at least give students a reasonable prop size and conventional air frame proportions that give them a realistic chance to get a model trimmed so that it can reliably circle in one direction for 30+ seconds. Query, did any of the members of the flying events committee of the National SO organization ever build and try to fly an airplane in accordance with the WS 2020 rules before adopting them?

I read a troubling account on the Hip Pocket Aeronautics (HPA) website about one regional WS 2020 competition. There were just shy of 30 teams competing and the average flight time was less than 6 seconds. No team was able to have its airplane circle in opposite directions. Many airplanes were stuffed in a trash can

after that competition. This is very sad as WS has, for a number of years, been breathing life into the free flight hobby. Unfortunately, many students will be frustrated by the WS 2020 event and will wash their hands of free flight. RPA would have been a far superior event than the WS 2020 event. Adding insult to injury, I recently learned that WS 2021 will operate under the same rules as WS 2020. Due to my public criticism of the WS 2020 rules I am somewhat of a pariah in the eyes of the flying events committee of the national SO organization. However, I have good company in the form of Joshua Finn, Bill Gowen and many other experienced indoor fliers who feel the same as me and have been vocal about it. Let's hope that the flying events committee of the national SO organization reconsiders and at least allows a larger prop and/or larger stab under the WS 2021 rules.

Francis Parker Gold Medal Airplane – Wright Stuff 2015

Pictures from indoor flying at Grossmont College April 2019



Photos by:
Arlene Bartick

RUBBER POWERED AIRPLANE

Submitted by Michael Jester

1. **DESCRIPTION:** Prior to the tournament teams will design, construct, and test free-flight rubber-powered airplanes to achieve maximum time aloft.

A TEAM OF UP TO: 2 **IMPOUND**: None **TIME**: 8 minutes

2. **EVENT PARAMETERS**:

a. Teams may bring up to two airplanes, any tools, and their flight log.
b. The Event Supervisor must provide all measurement materials and timing devices.

3. **CONSTRUCTION PARAMETERS**:

a. Airplanes may be constructed from student design, published plans, and/or commercial kits. Kits must not contain any pre-glued joints or pre-covered surfaces.
b. Any materials except Boron filaments may be used in construction of the airplanes.
c. The total mass of each airplane, excluding the rubber motor, must be at least 5.0 g.
d. Each airplane must be built to fit into a FedEx Large Box® (L1: rectangular and shallow in shape), advertised to have interior dimensions of 12-3/8 x 3 x 17-1/2 inches (approximately 31.4 x 7.6 x 44.4 cm), while in flight configuration.
e. Each airplane may have any air frame configuration (tractor, pusher, canard, bi-plane, twin propellers, etc.) and need not resemble a conventional "airplane" shape.
f. Airplanes may only be propelled in-flight through the release of mechanical energy stored in wound rubber motors. No other energy source may be used to keep the airplane aloft.
g. Propeller assemblies may be student-built or purchased. Variable pitch propellers that include mechanisms to actively change the blade diameter or angle must not be used. There are no restrictions on the number, size, or construction of each propeller assembly.
h. Rubber motor(s) may include one or more strands or loops of rubber. Attachments such as O-rings and lubrication are permitted. There are no other restrictions on the dimensions, weight, or number of rubber motors that power the airplane(s).
i. The airplane(s) must be labeled with student's school name and team number.
j. Students must be able to answer questions regarding the design, construction, and operation of their airplane(s) consistent with the Building Policy found at ww.soinc.org.

4. **THE COMPETITION**:

a. The event must be held indoors. Tournament officials must announce the dimensions of the flying site (approximate length, width and flyable height to the lowest ceiling obstruction) in advance of the competition. Tournament officials and the Event Supervisor are urged to take steps in advance of and on the day of the competition to turn off the HVAC. Air currents should be minimized by keeping doors and windows closed while airplanes are in flight.
b. The competition area shall be cordoned off. Once students enter the competition area to compete they cannot leave the competition area until they are finished competing. They must not receive outside assistance, materials, or communication. Spectators must remain outside the competition area.
c. Students must present their airplane(s) and flight log for inspection before their 8-minute Flight Period. The Event Supervisor will notify the student if the airplane(s) or flight log are not in compliance with the rules and what penalties, if any, will be incurred as a result.
d. The flight log must include data for at least 10 test flights with at least the following parameters: rubber motor size, approximate number of winds at launch, and flight duration. Additional parameters are encouraged but not required in the flight log.
e. Size conformance for the airplane(s) will be demonstrated using the following procedure with a FedEx Large Box® provided by the Event Supervisor:
    i. The student will load the airplane (with or without propeller assemblies and rubber motor(s) installed) into a provided box through the standard open end without causing any significant deformation of the airplane.

ii. While the student is holding the box, the Event Supervisor or a designated volunteer will pass a ruler along the face of open end of box. The ruler must not contact the airplane.

iii. Next, the student will tip or fully invert the box which must cause the airplane to slide out of the box under its own weight. Pulling on the airplane, shaking the box, or tapping on the box must not be necessary to remove the airplane from the box and will not be permitted.

f. To account for potential small variations in the manufacture of the FedEx Large Box®, the Event Supervisor will supply at least two boxes to be used at check-in. An airplane that passes the size conformance procedure for at least one of the provided boxes will be considered acceptable. An airplane that cannot pass the size conformance procedure for any of the boxes provided by the Event Supervisor will violate the rules.

g. A self-check station, within the competition area, may be made available to students for checking their airplanes prior to a team's official check-in with the Event Supervisor and/or the designated volunteer(s). A FedEx Large Box® shall be located at the self-check station.

h. Each team will be given an official 8-minute Flight Period, starting when their first official flight begins. During the Flight Period, students may conduct practice flights and up to 2 official flights. All flights will be assumed to be official flights unless clearly declared as practice flights to the Event Supervisor before the flight. Students may also repair and adjust their airplane(s) during this time.

i. At the discretion of the Event Supervisor multiple official flights may occur simultaneously. Teams may elect a re-flight in the unlikely event of a collision with another airplane. Practice flights may occur throughout the competition but must yield to official flights. No practice flights will occur in the final half-hour of the competition except for teams that declare a practice flight during their Flight Period. The Flight Period shall be extended at the discretion of the Event Supervisor to accommodate any re-flight necessitated by a collision with another airplane or to avoid conflicting simultaneous launches.

j. Students must launch their airplanes(s) by hand while standing or kneeling at floor level. No external equipment may be used in contact with the airplane during the launch. Students may not steer their airplanes in flight.

k. An official flight time shall be the time aloft, beginning when the airplane leaves the student's hands and ending when any part of the airplane hits the floor, the airplane becomes lodged on an obstruction (such as a beam, light fixture or basketball backboard), or the Event Supervisor otherwise determines the flight to be over.

l. Event Supervisors are strongly encouraged to utilize three independent timers on flights. The median of the three times should be recorded as the official flight time, in total seconds and hundredths of seconds (Ex: 147.21 seconds).

m. The Event Supervisor will verify the recorded official flight time(s) and any incurred penalties with the students.

5. **SCORING**:

a. A team's score is the duration of the team's longest official flight, in total seconds and hundredths of seconds, reduced by any penalties. Teams shall be ranked based on this score, with the highest score being the winner of the event.

b. Ties shall be broken using the score calculated with the team's second longest official flight.

c. Teams with an incomplete flight log shall have 10% deducted from each official flight time.

d. Teams with no flight log shall have 30% deducted from each official flight time.

e. Teams that violate any rule(s) under CONSTRUCTION PARAMETERS or THE COMPETITION will be ranked behind all teams that do not violate any rules.

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ANNOUNCEMENTS -

Dual-Clubs Free Flight Bonanza annual contest has been cancelled.

San Valeers Annual contest has been postponed until the scheduled **Fall Nostalgia** contest

Piper J5A Super Cruiser - Don Bartick

Like so many out there in Orbiteers land dealing with the Coronavirus pandemic and the ruling by our government to hunker in place gives lots of time to catch up on household projects and best of all to dust off a couple model projects.

I purchased from John Hutchison one of the Piper J5A Super Cruiser short kits he acquired a couple years ago for promoting a One Design contest. I started the kit back them and put the bones on the shelf. Two week ago, I got it down and decided to finish the build. I just finished it and thought it gwould be worthy to show in the ET. The build appeared reasonable up to the 90% point. The completion became more challenging because of some of details required. The nose block accommodates a Gizmo prop drive with a 7" propeller. It is a cut down 8" Gizmo version. See pictures of the final build.
Don

From The Workbench - John Merrill

Hello from my ridiculously messy workshop! Now that I'm furloughed with the rest of the world, I'm trying to do a little modeling almost every day. I've had several projects just sitting and waiting for me, and here's one of those.

This is a 12" wingspan, peanut scale P-47 Thunderbolt, built from a Gene Dubois kit. Almost a dime-scale type kit, just smaller. The plane isn't assembled yet; I'm waiting for some graphics I've ordered from Callie-Graphics. She's a home-based company based out of New Mexico, and I've found her stuff to be very nice quality and easy to apply.

You are, or should be; staying home more now, so send in a picture or two of what's on your building board!

My very best to you, and please stay healthy!
John

San Diego Orbiteers Board of Directors Meeting March 11, 2020

Held at Mike Pykelny's home. Only 8 in attendance tonight, including our hosts Mike and Linda, Don and Arline Bartick, John and Kathleen Hutchison, President Mark Chomyn, and John Merrill.

After a wonderful corned beef dinner, the meeting was **called to order** at 7:16 pm.

Minutes of the previous board meeting were accepted as published.
Treasurer's Report was accepted as submitted to the board.
Membership Report: Linda has been on top of delivering our brochures to various hobby shops, as well as a few museums and businesses. Thank you to Linda for doing all that for us.

Old Business:

Mark Chomyn had found a spot off of Gird Road in the Bonsall area that may have been suitable to do some test flights. He reported that the site, although yet undeveloped, is the property of the Bonsall Unified School District. Unfortunately, the District rules state that no model aircraft flying is permitted on their premises, among many other regulations.

Is splitting the HLG and CLG categories and monthly contests working okay? The consensus seemed to be that it is indeed working thus far.

Annual Banquet: another success? Absolutely, thanks in large part to Linda for all her work in coordinating with the restaurant, all the decorations, etc. Many others pitched in to help as well, so thank you to all that helped make it a splendid afternoon.

New Business:

AMA charter renewal: in process, Mark is working on it, almost done.

April P-30 Oldenkamp Memorial: same format? No change. Special award for winning with a Hotbox. Contest April 19th, rain date April 26th.
Note: since the meeting the news of COVID19 has arrived. It seems unlikely this contest will take place as scheduled. Check our website or call one of the club officers listed elsewhere in this newsletter, or wait for email updates if you get those for further information and updates.

Appoint a "keeper of the points" to replace Mike Jester: Mike Pykelny will now keep records of the outdoor points, and John Hutchison will monitor the indoor points henceforth. Thank you to both for those efforts.

Contest Reports:

Don Bartick reported on the Southwest Regional's in Eloy, AZ. He said he won several awards. Mike Pykelny was there as well, both men did well. Good flying weather this year.

Mike reported on the Isaacson/Kiwi Cup in Lost Hills, CA. He said there wasn't as much participation as in previous years, but still pretty decent turnout.

Other reports: John Hutchison said that the indoor contests held on the 1st Sunday of every month at the Grossmont College gym are doing very well, with good attendance and great flying.

Don also reported that the Dual-Club Annual Contest is essentially ready to go in Lost Hills.
Note: again, due to the COVID19 virus, this may be shut down for this year. Watch for emails or other updates.

Open Discussion: P-20 and E-20 were discussed at length, no formal results, however. May explore those events to be added into our rotation in the future.

Good of the Order: Kathleen asked that if there any changes that need to be made to the website to please let her know.

Next board meeting to be at the Bartick's home on June 10th.

Call for adjournment came at 8:48p.m.

Respectfully submitted by John R. Merrill, Secretary

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One Design Paper Airplane

Living Room Postal Contest

Sponsored by El Torbellino NL

So, got some time on your hands? Like to try a few test flights in your home? How about building a one-design paper airplane? Well OK then, the design for this beauty is printed on the following page for your consideration.

Pick out the room in your house that has the most volume that could serve as your personal indoor flying venue.

Down load and print your paper airplane template from the file that is attached to the email that brought you this newsletter.

Decide if you are going plain paper, or if you are adding scale detail to your paper airplane entry. Send pictures of your scale, no-scale, artful, or otherwise spiffed up appearance of your paper airplane entry. Pictures will be printed with results next month.

So now let's get some flights in!

Guide Lines and Rules:

- Unlimited flight attempts
- A friendly nod for airplane graphics
- One entry per contestant
- Submit best flight time to Editor, Hlhaupt1033@att.net

- Also, send along with your flight time some information about your personal Indoor Flying Venue, such as its length, width and height.

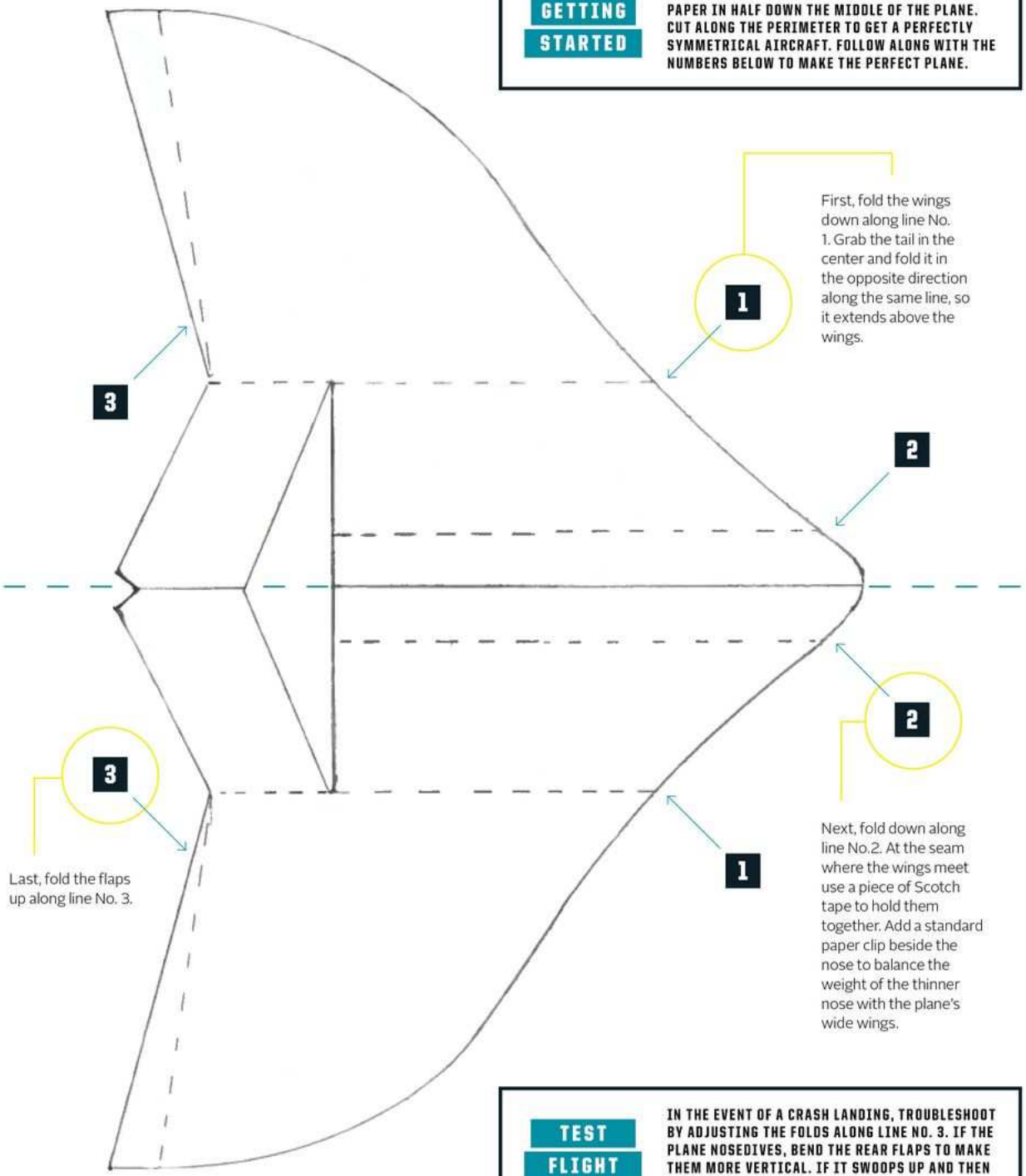
- New winner will be crowned each month until the authorities give us the all clear to resume normal activities. - Scoop

Down load and print template from file attached to the email that brought you this newsletter.

PAPER AIRPLANE // PRINTABLE TEMPLATE

GETTING STARTED

PRINT OUT THIS TEMPLATE. START BY FOLDING THE PAPER IN HALF DOWN THE MIDDLE OF THE PLANE. CUT ALONG THE PERIMETER TO GET A PERFECTLY SYMMETRICAL AIRCRAFT. FOLLOW ALONG WITH THE NUMBERS BELOW TO MAKE THE PERFECT PLANE.



TEST FLIGHT

IN THE EVENT OF A CRASH LANDING, TROUBLESHOOT BY ADJUSTING THE FOLDS ALONG LINE NO. 3. IF THE PLANE NOSEDIVES, BEND THE REAR FLAPS TO MAKE THEM MORE VERTICAL. IF IT SWOOPS UP AND THEN DIVES STRAIGHT DOWN, FLATTEN THEM.

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Word Search Answers

A	H	P	Q	A	O	F	D	F	J	Z	W	S	V	K
R	E	B	B	U	R	L	C	L	X	H	Y	A	R	U
S	M	R	A	P	E	N	N	Y	P	L	A	N	E	J
A	B	G	O	R	B	I	T	E	E	R	S	P	M	W
U	R	Y	B	N	E	N	W	R	R	U	M	Y	I	U
W	Y	N	E	V	A	S	O	P	R	L	R	E	T	T
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B	C	W	N	A	E	J	T	L	S	S	K	H	D	G
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K	A	G	R	E	I	B	E	D	P	M	O	T	O	R
C	T	A	O	W	H	U	Z	R	X	W	O	Y	P	F

Pictures from Outdoor flying at Perris, April 2019 - Photos by: Arline Bartick

Grounded

Forget planes. This is the equipment that keeps the world flying.

Commercial airliners don't just magically leap skyward. To get there, they need ground support—support that often comes from highly specialized vehicles (and sometimes from ordinary trucks, vans, and cars). United Airlines flies about 800 planes and has more than 36,000 vehicles in its ground fleet that pump fuel, load luggage, and haul away human waste at 266 locations around the world. What are the terrestrial machines that keep the flying ones aloft? We spoke with Ray Ames, managing director of United's ground services equipment, to find out. ***–John Pearley Huffman***

A BELT LOADER

Loaders come in various sizes to serve specific aircraft and have height-adjustable conveyor belts for moving baggage into and out of planes. Most loaders burn fuel—be it gasoline, diesel, or propane—but electric drivetrains are increasingly common. United has 1468 loaders in service.

B PUSHBACK TUG/TRACTOR

For safety reasons, most airlines won't allow a plane to back away from a gate under its own power. Instead, they employ pushback tugs and tractors to move the plane to where it needs to be. While conventional tugs use tow bars to move aircraft, the tow-barless type simply picks up a plane's nose-gear wheels. Lektro's lyrically named AP8950SDB-AL-200 is an example of the latter. It uses a 58-hp electric motor and two 27.2-kWh batteries and can move up to 210,000 pounds, enough for narrow-body airliners like the Boeing 737. To tow the largest planes, you need a supertug such as JBT's hydrostatic all-wheel-drive Expediter 600, which uses a 570-hp Mercedes 15.9-liter diesel V-8 to generate juice for its four electric motors.

LAVATORY-SERVICE VEHICLE

When you flush an airplane toilet, the waste doesn't just fall from the sky. It's vacuumed away to a storage tank, which needs to be emptied. "There's not much to them," says Ames of United's 122 lavatory-service vehicles. If you've been at a KOA on a Sunday afternoon, you have the basic idea.

C BAGGAGE TRACTOR

Of United's motorized ground-support vehicles, baggage tractors are king. The airline has 3526 of them. The latest are electric tractors, which are driven by people, but autonomous machines are coming. United has 4009 baggage carts as well as 5114 cargo carts that can be towed in multicart trains.

D DE-ICER

In cold weather, de-icers are critical. Ice accumulation on a plane's wings affects lift and control. Not good. De-icers have cherry-picker buckets from which an iceman controls the sprayer, blasting the plane with a mixture of water and glycol that breaks up the ice and snow. "If anything is fun to operate, it's the de-icer," says Ames. "It's a challenge to knock ice off."

SAN DIEGO ORBITEERS
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WHAT'S NOT HAPPENING

Dual-Clubs Free Flight Bonanza annual contest has been cancelled.

San Valeers Annual contest has been postponed until the scheduled **Fall Nostalgia** contest.

WHAT'S HAPPENING - April 2020

April 2020 - **Orbiteer Living Room Postal Indoor Paper Airplane Contest**
All Month – Open to all entries nation wide.
(See enclose for details)