HSS is the oldest AMA chartered R/C Soaring Club in the USA. Founded in 1964.
September 2020 HSS IS NOW OVER 56 YEARS OLD! Volume 57

HSS PLANE RAP NEWSLETTER

Field closed by Orange County until further notice.
Members are requested not to go to the field.

Plane Rap Index

Check out the following articles:

Coming Events and Soaring Competitions.
September 2020 – October 2020

- All meetings are cancelled until further notice.
- The field is closed until further notice.
- All events for the next 60 days are cancelled.
- Events planned for after June 1, 2020, are postponed.
- **October General or virtual meeting to nominate club officers for 2021.**

U.S. Nears Law Banning Chinese Drones

The following article is borrowed from Electric Silent Flyers of San Diego (ESFSD) Peak Charge Newsletter, thanks to Steve Belknap, Editor.

By Mark Huber - August 17, 2020,

An amendment to ban U.S. government use of Chinese drones appears almost certain to become law within weeks. Contained within the National Defense Authorization Act (NDAA), the measure bans the purchase of commercial drones made by a "covered foreign entity," including China, by any U.S. government agency. The ban covers both purchases of new drones and flights of drones already in agency fleets, which would need to end within six months. The ban extends to drone components including drivetrains, cameras, and circuit boards. Orders for components already contracted for could be completed up to one year following enacted. The amendment has survived both the House- and Senate-passed versions of the NDAA and seems assured to be in the final legislation that is presented for signature by President Trump.

The amendment's author, U.S. Rep. Mike Gallagher (R-Wisconsin), said the measure was necessary for national security. "Drones manufactured by foreign adversaries should be nowhere near the federal government. This equipment from countries like China uses taxpayer dollars to support the Chinese Communist Party's near-monopoly on this critical market, while also posing a serious national security threat. It is imperative that Congress pass this bipartisan bill to protect U.S. interests, our communities, and our national security supply-chain."

Originally offered last year as stand-alone legislation entitled "The American Security Drone Act," the amendment prohibits the purchase of drones and components from countries deemed national security threats. The ban extends to use of federal grants and contracts for purchase of these items by state and local governments. The ban is aimed primarily at Chinese drone-maker DJI, which controls 70 percent of the U.S. drone market and has repeatedly denied that data from its drones is harvested by the Chinese government. In a statement released earlier this summer, the company said, "We design our systems so DJI customers have full control over how or whether to share their photos, videos and flight logs, and we support the creation of industry standards for drone data security that will provide protection and confidence for all drone users." However, security concerns prompted the U.S. Army to ban the use of DJI drones as early as 2017 and earlier this year the U.S. Department of Interior grounded its entire fleet of 800 DJI drones for similar reasons. Earlier this month, the security firm Synacktiv reported potential vulnerabilities in DJI's security app. DJI called such claims "misleading" and said there was "no evidence of unexpected data transmission connections from DJI's apps designed for government and professional customers."

Ultralight Lithium-Sulfur Batteries.

The following article is borrowed from Electric Silent Flyers of San Diego (ESFSD) Peak Charge Newsletter, thanks to Steve Belknap, Editor.
By Mark Crittenden. Head of battery development and integration at Oxis Energy, in Oxfordshire, U.K.

Electric aircraft are all the rage, with prototypes in development in every size from delivery drones to passenger aircraft. But the technology has yet to take off, and for one reason: lack of a suitable battery.

For a large passenger aircraft to take off, cruise, and land hundreds of kilometers away would take batteries that weigh thousands of kilograms—far too heavy for the plane to be able to get into the air in the first place. Even for relatively small aircraft, such as two-seat trainers, the sheer weight of batteries limits the plane's payload, curtails its range, and thus constrains where the aircraft can fly. Reducing battery weight would be an advantage not only for aviation, but for other electric vehicles, such as cars, trucks, buses, and boats, all of whose performance is also directly tied to the energy-to-weight ratio of their batteries.

For such applications, today's battery of choice is lithium ion. It reached maturity years ago, with each new incremental improvement smaller than the last. We need a new chemistry.

Since 2004 my company, Oxis Energy, in Oxfordshire, England, has been working on one of the leading contenders—lithium sulfur. Our battery technology is extremely lightweight: Our most recent models are achieving more than twice the energy density typical of lithium-ion batteries. Lithium sulfur is also capable of providing the required levels of power and durability needed for aviation, and, most important, it is safe enough. After all, a plane can't handle a sudden fire or some other calamity by simply pulling to the side of the road.

The new technology has been a long time coming, but the wait is now over. The first set of flight trials have already been completed.

Fundamentally, a lithium-sulfur cell is composed of four components:

- The positive electrode, known as the cathode, absorbs electrons during discharge. It is connected to an aluminum-foil current collector coated with a mixture of carbon and sulfur. Sulfur is the active material that takes part in the electrochemical reactions. But it is an electrical insulator, so carbon, a conductor, delivers electrons to where they are needed. There is also a small amount of binder added to ensure the carbon and sulfur hold together in the cathode.
- The negative electrode, or anode, releases electrons during discharge. It is connected to pure lithium foil. The lithium, too, acts as a current collector, but it is also an active material, taking part in the electrochemical reaction.
- A porous separator prevents the two electrodes from touching and causing a short circuit. The separator is bathed in an electrolyte containing lithium salts.
- An electrolyte facilitates the electrochemical reaction by allowing the movement of ions between the two electrodes.

These components are connected and packaged in foil as a pouch cell. The cells are in turn connected together—both in series and in parallel—and packaged in a 20 ampere-hour, 2.15-volt battery pack. For a large vehicle such as an airplane, scores of packs are connected to create a battery capable of providing tens or hundreds of amp-hours at several hundred volts.

Lithium-sulfur batteries are unusual because they go through multiple stages as they discharge, each time forming a different, distinct molecular species of lithium and sulfur. When a cell discharges, lithium ions in the electrolyte migrate to the cathode, where they combine with sulfur and electrons to form a polysulfide, Li_2S_8. At the anode, meanwhile, lithium molecules give up electrons to form positively charged lithium ions; these freed electrons then move through the external circuit—the load—which takes them back to the cathode.

Ultralight Lithium-Sulfur Batteries (Continued)

In the electrolyte, the newly produced Li_2S_8 immediately reacts with more lithium ions and more electrons to form a new polysulfide, Li_2S_6. The process continues, stepping through further polysulfides, Li_2S_4 and Li_2S_2, to eventually become Li_2S. At each step more energy is given up and passed to the load until at last the cell is depleted of energy.

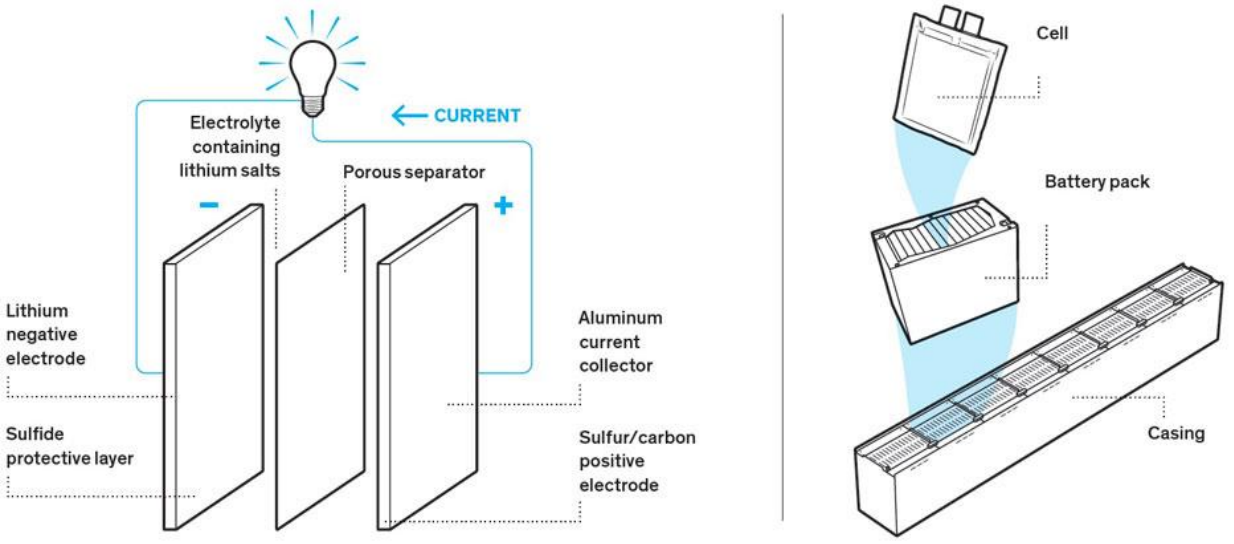
Electric Power Systems: Analysis and Control

Recharging reverses the sequence: An applied current forces electrons to flow in the opposite direction, causing the sulfur electrode, or cathode, to give up electrons, converting Li_2S to Li_2S_2. The polysulfide continues to add sulfur atoms step-by-step until Li_2S_8 is created in the cathode. And each time electrons are given up, lithium ions are produced that then diffuse through the electrolyte, combining with electrons at the lithium electrode to form lithium metal. When all the Li_2S has been converted to Li_2S_8, the cell is fully charged.

This description is simplified. In reality, the reactions are more complex and numerous, taking place also in the electrolyte and at the anode. In fact, over many charge and discharge cycles, it is these side reactions that cause degradation in a lithium-sulfur cell. Minimizing these, through the selection of the appropriate materials and cell configuration, is the fundamental, underlying challenge that must be met to produce an efficient cell with a long lifetime.

Anatomy of a Battery

A lithium-sulfur cell goes through stages as it discharges [left]. In each stage, lithium ions in the electrolyte flow to the cathode, where they form polysulfides having ever higher sulfur-to-lithium ratios. Charging reverses the process. Cells are linked into battery packs, which themselves fit into a casing, along with battery-management devices.



One great challenge for both lithium-ion and lithium-sulfur technologies has been the tendency for repeated charging and discharging cycles to degrade the anode. In the case of lithium ion, ions arriving at that electrode normally fit themselves into interstices in the metal, a process called intercalation. But sometimes ions plate the surface, forming a nucleus on which further plating can accumulate. Over many cycles a filament, or dendrite, may grow until it reaches the opposing electrode and short-circuits the cell, causing a surge of energy, in the form of heat that irreparably damages the cell. If one cell breaks down like this, it can trigger a neighboring cell to do the same, beginning a domino effect known as a thermal runaway reaction—in common parlance, a fire.

With lithium-sulfur cells, degradation of the lithium-metal anode is also a problem. However, this occurs via a very different mechanism, one that does not involve the formation of dendrites. In lithium-sulfur cells, uneven current densities on the anode surface cause lithium to be plated and stripped unevenly as the battery is charged and discharged. Over time, this uneven plating and stripping causes mosslike deposits on the anode

Ultralight Lithium-Sulfur Batteries (Continued)

that react with the sulfide and polysulfides in the electrolyte. These mosslike deposits become electrically disconnected from the bulk anode, leaving less of the anode surface available for chemical reaction. Eventually, as this degradation progresses, the anode fails to operate, preventing the cell from accepting charge.

Developing solutions to this degradation problem is crucial to producing a cell that can perform at a high level over many charge-discharge cycles. A promising strategy we've been pursuing at Oxis involves coating the lithium-metal anode with thin layers of ceramic materials to prevent degradation. Such ceramic materials need to have high ionic conductivity and be electrically insulating, as well as mechanically and chemically robust. The ceramic layers allow lithium ions to pass through unimpeded and be incorporated into the bulk lithium metal beneath.

We are doing this work on the protection layer for the anode in partnership with Pulsedeon and Leitat, and we're optimistic that it will dramatically increase the number of times a cell can be discharged and charged. And it's not our only partnership. We're also working with Arkema to improve the cathode in order to increase the power and energy density of the battery.

Indeed, the key advantage of lithium-ion batteries over their predecessors—and of lithium sulfur over lithium ion—is the great amount of energy the cells can pack into a small amount of mass. The lead-acid starter battery that cranks the internal combustion engine in a car can store about 50 watt-hours per kilogram. Typical lithium-ion designs can hold from 100 to 265 Wh/kg, depending on the other performance characteristics for which it has been optimized, such as peak power or long life. Oxis recently developed a prototype lithium-sulfur pouch cell that proved capable of 470 Wh/kg, and we expect to reach 500 Wh/kg within a year. And because the technology is still new and has room for improvement, it's not unreasonable to anticipate 600 Wh/kg by 2025.

When cell manufacturers quote energy-density figures, they usually specify the energy that's available when the cell is being discharged at constant, low power rates. In some applications such low rates are fine, but for the many envisioned electric aircraft that will take off vertically, the energy must be delivered at higher power rates. Such a high-power feature must be traded off for lower total energy-storage capacity.

Furthermore, the level of energy density achievable in a single cell might be considerably greater than what's possible in a battery consisting of many such cells. The energy density doesn't translate directly from the cell to the battery because cells require packaging—the case, the battery management system, and the connections, and perhaps cooling systems. The weight must be kept in check, and for this reason our company is using advanced composite materials to develop light, strong, flameproof enclosures.

Ultralight Lithium-Sulfur Batteries (Continued)

Photos: Bye Aerospace; Oxis Energy

All Amped Up: Bye Aerospace's eFlyer 2 [top] is designed to train pilots. Bye is working with Oxis Energy on a lithium-sulfur battery that promises to increase the plane's range. Bottom, a reel of positive electrode, made of sulfur, is being coated onto a current collector.

If the packaging is done right, the energy density of the battery can be held to 80 percent of that of the cells: A cell rated at 450 Wh/kg can be packaged at more than 360 Wh/kg in the final battery. We expect to do better by integrating the battery into the aircraft, for instance, by making the wing space do double duty as the battery housing. We expect that doing so will get the figure up to 90 percent.

To optimize battery performance without compromising safety we rely, first and foremost, on a battery management system (BMS), which is a combination of software and hardware that controls and protects the battery. It also includes algorithms for measuring the energy remaining in a battery and others for minimizing the energy wasted during charging.

Like lithium-ion cells, lithium-sulfur cells vary slightly from one another. These differences, as well as differences in the cells' position in the battery pack, may cause some cells to consistently run hotter than others. Over time, those high temperatures slowly degrade performance, so it is important to minimize the power differences from cell to cell. This is usually achieved using a simple balancing solution, in which several resistors are connected in parallel with a cell, all controlled by software in the BMS.

Even when charging and discharging rates are kept within safe limits, any battery may still generate excessive heat. So, typically, a dedicated thermal-management system is necessary. An electric car can use liquid cooling, but in aviation, air cooling is much preferred because it adds less weight. Of course, the battery can be placed at a point where air is naturally moving across the surface of the airplane—perhaps the wing. If necessary, air can be shunted to the battery through ducts. At Oxis, we're using computational modeling to optimize such cooling. For instance, when we introduced this technique in a project for a small fixed-wing aircraft, it allowed us to design an effective thermal-management system, without which the battery would reach its temperature limits before it was fully discharged.

As noted above, a battery pack is typically arranged with the cells both in parallel and in series. However, there's more to the arrangement of cells. Of course, the battery is a mission-critical component of an e-plane, so you'll want redundancy, for enhanced safety. You could, for instance, design the battery in two equal parts, so that if one half fails it can be disconnected, leaving the aircraft with at least enough energy to manage a controlled descent and landing.

Ultralight Lithium-Sulfur Batteries (Continued)

Another software component within the BMS is the state-of-charge algorithm. Imagine having to drive a car whose fuel gauge had a measurement error equivalent to 25 percent of the tank's capacity. You'd never let the indicator drop to 25 percent, just to make sure that the car wouldn't sputter to a halt. Your practical range would be only three-quarters of the car's actual range. To avoid such waste, Oxis has put a great emphasis on the development of state-of-charge algorithms.

In a lithium-ion battery you can estimate the charge by simply measuring the voltage, which falls as the energy level does. But it's not so simple for a lithium-sulfur battery. Recall that in the lithium-sulfur battery, different polysulfides figure in the electrochemical process at different times during charge and discharge. The upshot is that voltage is not a good proxy for the state of charge and, to make things even more complicated, the voltage curve is asymmetrical for charge and for discharge. So the algorithms needed to keep track of the state of charge are much more sophisticated. We developed ours with Cranfield University, in England, using statistical techniques, among them the Kalman filter, as well as neural networks. We can estimate state of charge to an accuracy of a few percent, and we are working to do better still.

All these design choices involve trade-offs, which are different for different airplanes. We vary how we manage these trade-offs in order to tailor our battery designs for three distinct types of aircraft.

- **High-altitude pseudo satellites (HAPS)** are aircraft that fly at around 15,000 to 20,000 meters. The hope is to be able to fly for months at a time; the current record is 26 days, set in 2018 by the Airbus Zephyr S. By day, these aircraft use solar panels to power the motors and charge the batteries; by night, they fly on battery power. Because the 24-hour charge-and-discharge period demands only a little power, you can design a light battery and thus allow for a large payload. The lightness also makes it easier for such an aircraft to fly far from the equator, where the night lasts longer.
- **Electric vertical take-off and landing (eVTOL)** aircraft are being developed as flying taxis. Lilium, in Germany, and Uber Elevate, among others, already have such projects under way. Again, weight is critical, but here the batteries need not only be light but must also be powerful. Oxis has therefore developed two versions of its cell chemistry. The high-energy version is optimized in many aspects of the cell design to minimize weight, but it is limited to relatively low power; it is best suited to HAPS applications. The high-power version weighs more, although still significantly less than a lithium-ion battery of comparable performance; it is well suited for such applications as eVTOL.
- **Light fixed-wing aircraft:** The increasing demand for pilots is coming up against the high cost of training them; an all-electric trainer aircraft would dramatically reduce the operation costs. A key factor is longer flight duration, which is enabled by the lighter battery. Bye Aerospace, in Colorado, is one company leading the way in such aircraft. Furthermore, other companies—such as EasyJet, partnered with Wright Electric—are planning all-electric commercial passenger jets for short-haul, 2-hour flights.

Three factors will determine whether lithium-sulfur batteries ultimately succeed or fail. First is the successful integration of the batteries into multiple aircraft types, to prove the principle. Second is the continued refinement of the cell chemistry. Third is the continued reduction in the unit cost. A plus here is that sulfur is about as cheap as materials get, so there's reason to hope that with volume manufacturing, the unit cost will fall below that of the lithium-ion design, as would be required for commercial success.

Oxis has already produced tens of thousands of cells, and it is currently scaling up two new projects. Right now, it is establishing a manufacturing plant for the production of both the electrolyte and the cathode active material in Port Talbot, Wales. Later, the actual mass production of lithium-sulfur cells will begin on a site that belongs to Mercedes-Benz Brazil, in Minas Gerais, Brazil.

This state-of-the-art plant should be commissioned and operating by 2023. If the economies of scale prove out, and if the demand for electric aircraft rises as we expect, then lithium-sulfur batteries could begin to supplant lithium-ion batteries in this field. And what works in the air ought to work on the ground, as well.
This article appears in the August 2020 issue of IEEE Spectrum "Ultralight Batteries for Electric Airplanes."

Calendar of Events

Thanks to John Rittenhouse for the preparation of the following Calendar of Events. Note this has been updated since last published in March 2020. Some of the activities have not been cancelled yet, but are subject to cancellation at a moment's notice.

Repeating activities include:

- Monthly General Meetings - 7 to 9 PM on the first Tuesday of each month. Held at Round Table Pizza restaurant. 11095 Warner Ave. Costa Mesa. **Cancelled.**
- Monthly Steering Committee Meetings - 6 to 7 PM on the first Tuesday of each month. Held at Round Table Pizza restaurant. 11095 Warner Ave. Costa Mesa. Additional meetings to be planned as required. **Cancelled.**
- Flying field maintenance on an as-needed basis.
- Quarterly meetings with the Orange County Parks Department. Coordinated by Theresa Sears.

Singular events:

- September 2021 FAA agreement with HSS expires.

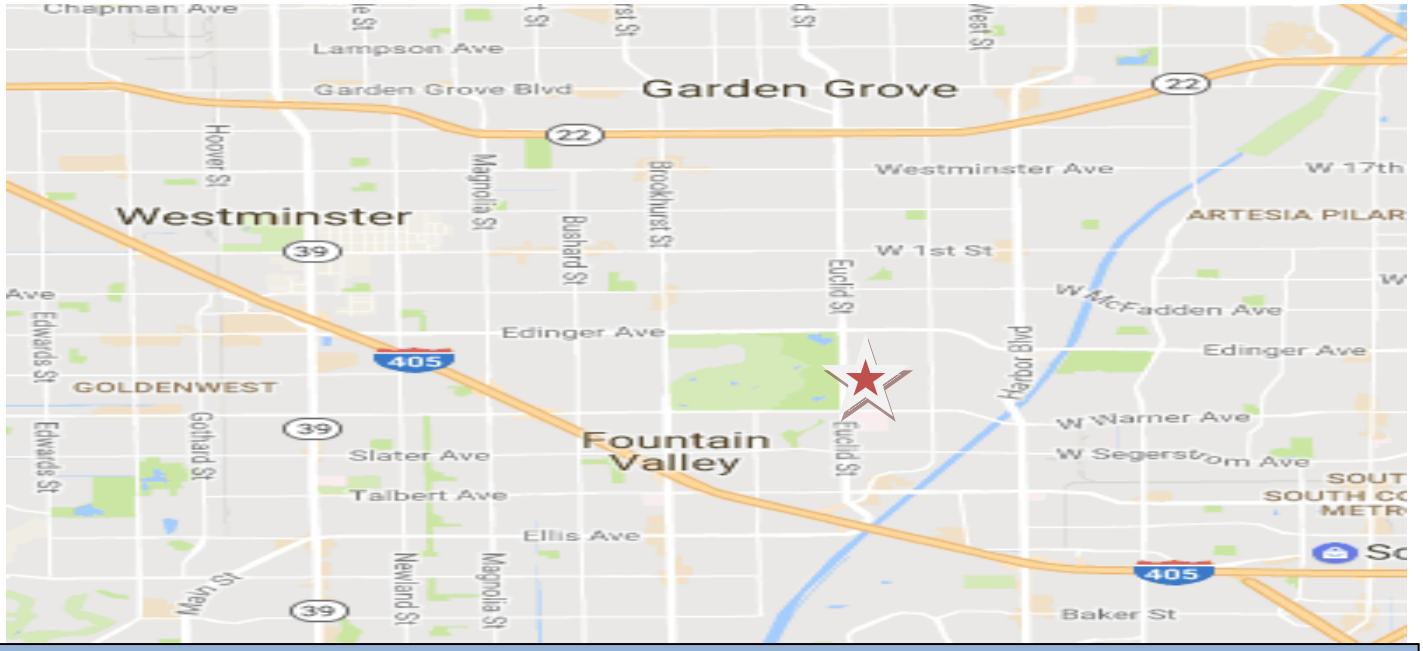
Annual Events:

- February Wix, website management and domain name re-registration payment due.
- March Network Solutions, website domain name re-registration payment due.
- March AMA charter and "Gold Leader Club" renewal.
- March Club must purchase "Certificate of Liability Insurance" from AMA.
- April Imaginology - This is a public service event held at the Orange County Fairgrounds. HSS provides booths containing static displays of model aircraft, build and fly paper gliders, and model flight simulators. **Cancelled.**
- June Southern California Soaring Clubs (SC-2) glider competition. HSS hosts local glider clubs, for one of the monthly events held throughout Southern California.*
- July Concerts at the Park - Three evenings on Tuesday nights in July at Fairview Park. Music is sponsored by the City of Costa Mesa. HSS supports this public service event with a pop-up sunshade, and static display of model aircraft.
- July Bent Wing Glider Competition. This event is open to all club members and guests.*
- August National Model Aviation Day. Open house, demonstrations, free flying lessons, and acquiring donations for charity.*
- August Dollar Foam Design/Build/Fly competition. Tentative schedule is Original designs are electric powered RC models made from a single sheet of paper backed 1/4" foam. Performance criteria to be determined.
- September Electric Fun Fly Competition. Tentative schedule is Multiple events are planned for club members and guests.
- October Pumpkin Festival/Scarecrow Competition. This is a public service activity for HSS. It is planned by the city, to be held at the Orange County Model Engineers railroad facility in Fairview Park.
- October Nominations made for new club officers.
- November New club officer election. General Meeting.
- December Christmas party and new club officer installation. Location to be determined.

* Note: Historical events are not currently scheduled, and are included for reference purposes only!

Next Meeting POSTPONEMENT

HSS meetings will be postponed until the existing government directives are recalled. At that time we will return to our normal schedule where we meet on the first Tuesday of each month at Round Table Pizza, 11095 Warner Ave. & Euclid (North-east corner) in Fountain Valley, at 7:00 PM. Phone number is (714) 839-0276. The Family Night rate is all-you can-eat pizza, plus one salad bar, for $8.99. Fountain drinks are an additional $1.59, self-service, or $2.99 per liter. Beer and wine are available. Bring your favorite plane for show-and-tell. Bring your wife, family, and friends. There will be a raffle. The location map is shown below.



Free Plane Rap Copies

Rob Askegaard has free near new color copies of HSS Plane Rap newsletters from 2005 through 2017 that he would like to give away. Contact Rob at the monthly meetings or 714-968-1973. rmaskegrd@gmail.com .

HSS Membership – Renew now if you haven't.

Our 2020 HSS membership enrollment season is running full speed. Note that the new membership rate of $25 per year is now in effect. PayPal will no longer be accepted as the cost and inconvenience did not justify the service. The latest membership application, dated 2020, is included in the last pages of this newsletter. These can be mailed to our post office box shown on the last page, or given to a club officer. Alternately, HSS and AMA membership applications can be obtained from any club officer, or available on our club web site at **www.harborsoaringsociety.org**.. Applicants must be members of the AMA prior to joining HSS. AMA Membership applications can also be obtained at the AMA web site **www.modelaircraft.org** , download document No. 902 from the publications page. Or you can apply on line. If you renew your AMA membership online, be sure to print the receipt that they provide as proof that you joined. And, don't forget your City of Costa Mesa Flying Permit. Details are shown on page 15 of this newsletter.

2020 City Flying Permits Available

A permit to fly radio-controlled model aircraft is required to operate model aircraft at Fairview Park. This permit can be obtained by going to www.costmesaca.gov and downloading the file Model Airplane Fly Permit 2014.pdf You must also show proof of adequate liability insurance in the form of a current Academy of Model Aeronautics (AMA) membership card or a current homeowners/personal liability policy specifically covering model aircraft operation with a minimum limit of $500,000. Rules and regulations for flying the model aircraft can be found in the City of Costa Mesa Municipal Code, Title 12, Chapter II, Articles 2 & 3.

Permit Fee: A 6 month permit costs $25 for Costa Mesa residents. $28 for nonresidents, plus $5 Administration fee. Learner's Permit for youths 6-14 years old - $TBD per year.

WALK-IN Costa Mesa City Hall (77 Fair Drive, Costa Mesa 92626), 3rd Floor Recreation Counter Tuesday through Thursday from 8:00 AM – 4:30 PM (excluding City-observed holidays),

MAIL-IN Mail your renewal packet (see list below), to include full payment, to:

Recreation Division – Fly Permit

City of Costa Mesa, P. O. Box 1200, Costa Mesa, CA 92628

Renewal Packet must include **ALL** of the following:

- Permit Application (filled out and signed).
- Copy of your driver's license.
- Copy of the AMA Membership Card (showing the required year), or home owner's/personal liability insurance policy (specifically covering model airplane/aircraft flying with a minimum limit of $500,000).
- Renewal Fee payment by Check (payable to City of Costa Mesa) or charge to Credit Card (filled out and signed).

Note: Current permit holders with email addresses on file with the City will receive renewal packet via email.

If you have questions or need additional information, please call the Recreation Division at (714) 754-5300.

Note that to fly at Fairview Park you need the above permit, liability insurance (preferably AMA), and you need to follow City of Costa Mesa Ordinance No. 07-01, City Regulations for Issuance, Suspension and Revocation of Permits to Fly at Fairview Park, Academy of Model Aeronautics Safety Code, and the Fairview Park Flying rules posted at the flying site.

Invitation To Members For Contributions To The Plane Rap Newsletter

Your editor would love to hear from club members. If there is anything you would like to share with the rest of us I would like you to send it to me. I will add it to the next newsletter. My favorite things to publish are items sent in by members!! These can be anything like reviews of your plane or equipment, links to good videos, links to articles, and things you have built or created. Bad spelling and/or grammar gladly accepted. Anything from a picture with a caption to a full blown build/review article is good. Letters-to-the-Editor are always welcome as well. Tell us what you think. Please help make the newsletter and website more interesting with your submissions. Embarrassing pictures/videos are the best. I look forward to hearing from you.
Fred Hesse - Plane Rap Editor - fhesse@socal.rr.com .

Photos of Your Planes

We are very fortunate to have Rob Askegaard as our club photographer. Rob has a high degree of talent, and supplements that with an excellent camera. His well composed and very realistic photos taken at ground level and his remarkable stop action in-flight pictures are superb. Rob's contributions are what make our newsletter really spectacular. We try to feature everyone and their planes, so if you haven't seen yourself in our newsletter, look for Rob just about any morning and pose for him. Anyone who wishes a high quality print or jpg file of their favorite plane should contact Rob, or your editor. Phone and E-mail information is shown on the last page of this newsletter.

Plane Rap Classified Ads and Services - For Sale

Mike Costello has a spectacular Pilot (brand), Reiher 3300 (3.3 meter/ 11') glider with fiberglass fuselage, all-wood wings & tail. All-flying horizontal stab. Built in the late 1970s and was hanging in the Hobby Shack/People store since then, Needs recovering, as over the years, the MonoKote has become quite brittle and has numerous holes. There are 2 servos installed and an Airtronics adjustable towhook. I flew this model once in an HSS contest back in the day, as well as Scott Miller.

Asking price is $300 or best offer. Contact Mike Costello, 714-875-7994, MikeFTRE@gmail.com

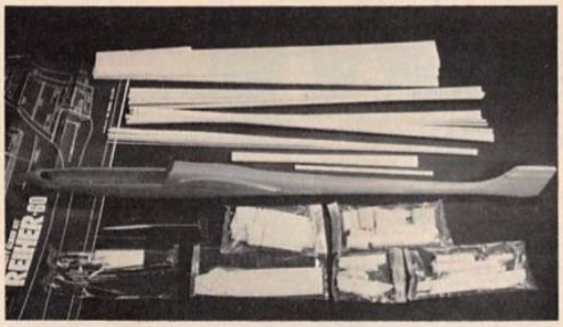
On the following page is a write-up published in RCM (Radio Control Modeler?) when the model was first introduced.

Editor's note: This is a beautiful model, in good structural condition.

Plane Rap Classified Ads and Services - For Sale (Continued)

RCM PRODUCT TEST

Hobby Shack
REIHER 3300



IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	●					Pre-Shaped Parts	●				
Plans		●				Parts Match to Plans	●				
Written Instructions			NA			Overall Parts Fit	●				
Quality of Hardwood		●				Ease of Assembly	●				
Quality of Fiberglass						Fidelity to Scale			NA		
Other Materials		●				Flight Performance	●				
Accessories		●				Overall Appeal	●				
Die-Cutting			NA								

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

The Reiher-3300 is manufactured by Pilot, and available from Hobby Shack. The kit comes with a fiberglass fuselage, all balsa and hardwood that will be needed to build. The hardware includes everything required, including a pre-formed canopy, wing wires, control rods, clevises, etc. Opening the box is really one pleasant surprise after another. What really makes the whole thing so nice is not only the completeness of it, but the really exceptionally fine quality of the component parts. Pilot has really packaged everything beautifuly, too. Outstanding quality material, and packaging. But you want to know how it goes together, looks, and flys, right? Well, Pilot and Hobby Shack haven't let you down. This is a really going concern in all departments, and the Reiher-3300 kit is, indeed, a lovely way to go.

For instance, ribs, bulkheads, canopy tray and all the other pieces that are such a chore to do, are already done - - - and sanded to the exact size and shape necessary, and sealed in their own clear plastic envelopes. You say you want more? Well, every individual rib, bulkhead, etc., is not only cut out and sanded for you, it also has a code number lightly imprinted on it! What does that do? Well, look at the plans, find the part with the imprinted number that matches what you are looking at on the plans, and there you are - - - half way home! And speaking of plans, these are very good indeed, so good, that separate instructions are not used. Conventional as well as perspective drawings assure an easy to follow blueprint for your building pleasure.

As mentioned earlier, the fuselage is fiberglass, and rates excellent in quality, finish & appearance. Color is moulded in, but if you wish, you can, of course, paint it in your own pet scheme and design.

And speaking of design, this sleek, polyhedral sailplane rates right at the top of the class when it comes to outright competition, or just fun-hunting thermals. Our only modification that would improve its' contest performance, would be the addition of spoilers. It's a smooth, easy flyer capable of contest winning. It'll win your eye when you see it - - - we know, it won ours. □

SPECIFICATIONS

Name	Reiher-3300
Aircraft Type	Thermal Glider
Manufactured By	Pilot — for Hobby Shack 18480 Bandilier Circle Fountain Valley, California 92708
Mfg. Suggested Retail Price	$79.99
Available From	Hobby Shack
Mfg. Recommended Usage	Thermal Glider
Wing Span	128 Inches
Wing Chord	7½" (Avg.)
Total Wing Area	960 Square Inches
Fuselage Length	52 Inches
Radio Compartment Dimensions	(L) 12" x (W) 2¼" x (H) 2¼"
Wing Location	Shoulder Wing
Airfoil	Flat Bottom
Wing Planform	Double Taper
Polyhedral	5° each panel
Stabilizer Span	33 Inches
Stabilizer Chord (incl. elev.)	5" (Avg.)
Total Stab Area	165 Square Inches
Stab Airfoil Section	Symmetrical
Stabilizer Location	Top Of Fuselage
Vertical Fin Height	10 Inches
Vertical Fin Width (incl. rud.)	6 Inches
Mfg. Rec. Engine Range	.NA
Recommended Fuel Tank Size	NA
Landing Gear	NA
Recommended No. Of Channels	2
Recommended Control Functions	Rudder & Elevator
Basic Materials Used In Construction:	
Fuselage	Fiberglass
Wing	Balsa
Tail Surfaces	Balsa
Hardware Included In Kit	See Text
Plan Size	25½" x 55½" (1 sheet)
Building Instructions on Plan Sheets	No
Instruction Manual	No
Construction Photos	No
Kit Includes	Shaped Parts
Mfg. Rec. Flying Weight	Not Given
Wing loading based on rec. flying wt.	6-8 oz./sq. ft.

RCM PROTOTYPE

Weight, Ready To Fly	40 Ounces
Wing Loading	6.35 oz./sq. ft.
Covering & finishing materials used	Super KwikCote & D.J.'s

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Plane Rap Classified Ads and Services - For Sale (Continued)

We recently received the following E-mail from Bela Kenessey, offering four gliders for sale. These are very high performance gliders by today's standards. Contact Bela if you are interested.

From: Bela Kenessey <btk56@icloud.com>
To: harborsoaringsociety@gmail.com
Subject: Gliders for sale

Mr. Henry Smith,

I am an ex-member of the Santa Clarita Soaring Club. Our club has disbanded many years ago due to the loss of our flying field. Currently my wife and I are in the process of downsizing and relocating. As a result, I would like to find a home for 4 very nice gliders in excellent condition (2 Onyx, 1 Topaz ....). I would consider some very low offers. The attached photos show 3 of them and a typical storage box for these three. The fourth one has a zippered carrying case. Please let me know if any of your members would be interested.

Bela Kenessey

HSS Sponsors

The following companies are proud sponsors of Harbor Soaring Society. They give us special offers, and make contributions to our monthly raffles. In return, please support them, and mention that you saw them advertised in the HSS Plane Rap newsletter.

AirPixel Technologies/FrSky Distributor

I just wanted to reach out on behalf of FrSky, as we are working directly with the manufacturer to do some community outreach to aviation clubs that are close to us here in Southern California, as provided by the AMA Club list. If anyone who happens to be a part of your club or organization is looking to purchase any number of **FrSky radios, receivers, gimbals**, or **other** FrSky products, we would love to assist in fulfilling these needs. During this outreach, we will be **lowering our prices to assist local clubs** in obtaining the necessary gear to get members flying as soon as possible. If you or anyone in your club is looking for products of this variety to assist in your RC aspirations, please do not hesitate to contact us via email or at our office phone number, which I will attach below, where we can answer questions regarding sales and warranty questions, and assist with any and all FrSky product related technical difficulties that you or your club members might run into.
Thanks so much for keeping the hobby alive and I look forward to hearing from you! -Brock

Brock Nelson <Brock@airpixeltek.com> **sales** <sales@airpixeltek.com>

AirPixel Technologies: North American FrSky Distribution and Service Center
9690 Telstar Ave. Suite 226 El Monte, CA 91731 Phone: 626-656-3121

MEMBERSHIP APPLICATION 2020

Harbor Soaring Society

AMA Chartered Club #128 - AMA's Oldest Chartered Soaring Club
P.O. Box 1673 Costa Mesa, CA 92628

I understand that by applying for membership in the Harbor Soaring Society I must be a current member of the AMA (Proof of status required, may be photocopy of membership card or AMA receipt of fees paid)

Name_____ **AMA #**_____

Address_____

City_____ **State**_____ **Zip**_____

Home Phone_____ **Work Phone**_____

Date of Birth_____ **Email**_____

- ☐ New Applicants (Without Name Tag) (all ages): $25.00
- ☐ Adult Member (Renewal Without Name Tag) (19 years and older as of July 1st): $25.00
- ☐ Junior Member (Without Name Tag) (19 years and under as of July 1st): $10.00
- ☐ Family Member (Without Name Tag) (At Same Address): $5.00
- ☐ Optional or Extra HSS Name Tag: $15.00
- ☐ I hereby give my permission to publish my [Name], [Address], [Phone], [Email Address] in the monthly Newsletter. **Strike out those not to be published**. Note that the Newsletter is published on the club Website (http://www.harborsoaringsociety.org)
- ☐ I request a printed copy of the monthly Newsletter by U.S. Mail. Printing and Mailing: $20.00/year

My primary interests in radio control flying are? Check all that apply. Show future interests with the letter F.

Thermal Duration Gliders_____	Slope Soaring Gliders_____	RES Gliders _____
Large Scale Gliders_____	Hand Launched Gliders_____	Electric Motor Gliders_____
Park Flyer Electric _____	Acrobatic Electric Planes_____	Scale Electric Planes_____
Electric Drones / Multi-rotor _____	Indoor Electric Planes_____	Electric Helicopters_____

In accordance with the Federal Equal Opportunity Act, this organization prohibits discrimination against anyone on the basis of race, color, religion, national origin, sex, marital status, age, individuals with disabilities or veterans. New applicants making application between November 1st and December 31st will pay the annual rate indicated above and such dues will make the new member paid in full for the following year. Applications for adult members submitted between July 1st and October 31st will pay a reduced rate of $15.00 (name tags extra). A signature is required from all Harbor Soaring Society applicants, agreeing to comply with the current AMA Safety Code, the current HSS and Costa Mesa City General Field Rules, and FAA rules and regulations applicable to the flying of RC model Aircraft.

The undersigned attests that: I will operate my model using only radio frequencies for the control of fixed wing or multi-rotor aircraft, and/or data transmission, on equipment certified and approved for such use by the AMA, FAA or FCC as applicable. I understand that my failure to comply with the above restrictions will result in nullification of liability coverage for damages caused or claimed. I understand that my monthly newsletter will be delivered by E-mail unless the U.S. Mail request (shown above) has been selected.

SIGNATURE:_____ DATE:_____

Total Dues Owed and Attached: $

SIGNATURE OF CLUB OFFICER RECEIVING APPLICATION: _____

HARBOR SOARING SOCIETY OFFICERS FOR 2020

President	Henry Smith III	714-322-6537	henry.smith.3@earthlink.net
Vice President	Joni Whitsitt	714-396-2523	whitsittjo@gmail.com
Treasurer, Membership	Don Wittenberg	714-321-3944	drwittenberg@verison.net
Secretary	Fred Hesse	714-963-5838	fhesse@socal.rr.com
Contest Coordinator	Bruce Schaefer	714-814-6412	metaterra@msn.com
Safety Coordinator	Kevin Koch	714-651-1246	kev380@yahoo.com
Grounds Keeper	Sid Hood	714-963-4964	sidlhood@yahoo.com
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Lead Flight Instructor	Henry Smith III	714-322-6537	henry.smith.3@earthlink.net
Flight Instructor	Jerome Mezzasalma	714-887-7913	sdgusa1@msn.com

Web site at www.harborsoaringsociety.org**, our YouTube site at** http://www.youtube.com/user/hssletsfly **, Facebook at** www.facebook.com/harborsoaringsociety **and E-mail at** harborsoaringsociety@gmail.com

SUBSEQUENT CLUB MEETINGS ARE CANCELLED FOR INDEFINTE DATE.
WHEN RE-INSTATED, THEY WILL BE AT ROUND TABLE PIZZA,
11095 WARNER AVE. COSTA MESA. GENERAL MEETING FROM 7 TO 9 PM.
BRING YOUR FAVORITE PLANE FOR SHOW AND TELL.
BRING YOUR FAMILY, WIFE, AND FRIENDS FOR DINNER.
SEE DETAILS AND INSTRUCTIONS TO LOCATION ON PAGE TBD.
SEE THE COLOR NEWSLETTER SENT BY E-MAIL AND AVAILABLE ON OUR WEB SITE.

Harbor Soaring Society
P.O. Box 1673
Costa Mesa, CA 92626