

PROP TALK



**THE NEWSLETTER OF THE
RIVERSIDE RADIO CONTROL
CLUB**

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State to pass law concerning drones

Another unenforceable "feel good" law coming down

When I was in the Strategic Air Command saving the country from the "Ruskies," there were multiple regulations we aircrews had to comply with. For example AFR 60-16 was a regulation concerning instrument flying. That was the "word on high" and could only be made more restrictive by amendments from lower levels of command. So SAC made their amendments followed by 15th Air Force and so on down the line, each making it more restrictive. It is happening with our state legislature who were not happy with the FAA's rules on drones. See the article below from the *Press Enterprise, Wednesday, Aug 31, 2016*:

DRONES BILL HEADS TO GOVERNOR'S DESK

State legislation that would mandate drones be equipped with shut-off technology and make owners of the unmanned flying devices carry insurance has cleared its final legislative hurdle and is heading toward Gov. Jerry Brown's desk.

The bill is sponsored by Assemblyman Mike Gatto, D-Los Angeles, who has been seeking since summer 2015 to curtail close calls with airliners and firefighting aircraft. It passed the Assembly on Tuesday, 43-20.

Named the Drone Registration/Omnibus Negligence-prevention Enactment, or DRONE Act, the 2016 bill would require that drones of a certain size with GPS be equipped with automatic shut-off technology to steer them away from airports and wildfire Zones.

Starting in 2020, owners would have to take out drone insurance policies to cover damage caused by them.

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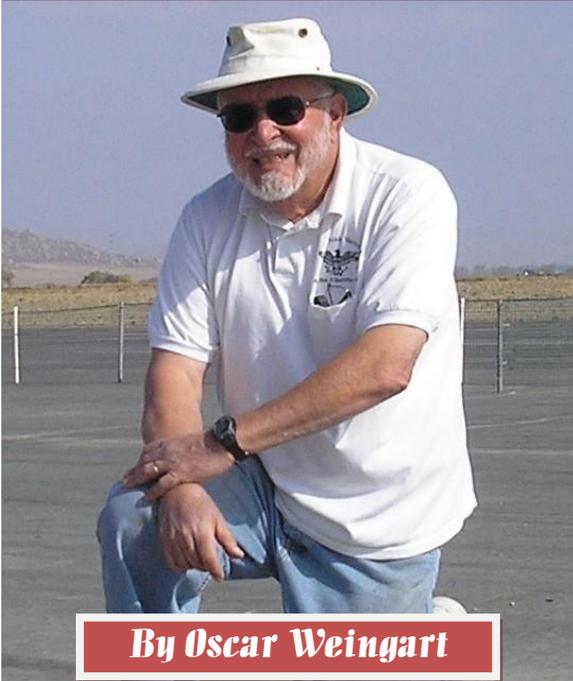
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**NEXT MEETING
SATURDAY
SEP 17TH
10:00 A.M.
CROWLEY
FIELD**

Oscar's Observations



By Oscar Weingart

Over the Summer, Doris and I were on our annual RV trip up the coast to get away from Riverside's triple digit hot weather. I took two electric RC planes along in the motor home's basement compartments, but the local geography and weather failed to cooperate, and I did not fly. We read a lot on our trips (and also at home). One of the books that I enjoyed was the recently re-titled and re-released "Sully", co-authored by Chesley "Sully" Sullenberger. In this self-exploring story, we learn of his early addiction to flying, culminating in a solo flight, followed by stints at the Air Force Academy and several years as an Air Force fighter pilot. Like many military pilots at that time, he ultimately joined U.S. Air, and accumulated many thousands of miles, hours and passengers, flying commercial jet airliners. He continued his hobby of flying gliders, and he started a side business consulting on Aircraft Safety.

On January 15, 2009, the world witnessed the "Miracle on the Hudson" when Captain Sullenberger glided his disabled plane onto the frigid waters of the Hudson River, saving the lives of all 155 aboard. However, even as Sully was being heralded by the public and the media for his unprecedented feat of aviation skill, an investigation was unfolding that threatened to destroy his reputation and his career. The book includes much insight

into Sully's personal life, and his philosophy on aircraft safety and pilot professionalism.

So, when we returned home on September 9th, the day that the new film "Sully" was released, we just had to go see it. This Clint Eastwood production, based on the book, did not disappoint, and I recommend it to all aviation buffs. The following review from the Internet expresses my feelings, better than I could ever write myself:

"It remains one of the indelible images of the 21st century. On a frigid January morning in 2009, dozens of passengers found themselves perched on the wings of US Airways Flight 1549 in the Hudson River. Well, ON the Hudson River. Just a few minutes after takeoff, the plane was struck by a flock of Canadian geese, rendering both engines powerless and necessitating a return to LaGuardia Airport, but when it was determined there wasn't enough time to reach LaGuardia

or any other nearby runway, the plane made an emergency crash landing on the water, and miraculously, all 155 passengers and crew survived.

At the helm of Flight 1549 was one Chesley "Sully" Sullenberger, who within 24 hours became one of the most famous American pilots this side of Charles Lindbergh. It seems almost a foregone conclusion Clint Eastwood would direct and Tom Hanks would star in the movie version of the story. (Can you think of a better starting battery? I can't.) As accomplished as they are, it would be an understatement to say Eastwood and Hanks meet expectations. This isn't just a solid piece of work; it's resonant!

The 86-year-old Eastwood gives us an electrifying thriller, a wonderful in-depth character study and a fascinating airline safety procedural, while Hanks delivers another in a long line of memorable, nomination-worthy performances. (Sidebar: How is it Tom Hanks hasn't been nominated for an Oscar since 2001 with "Castaway"? Could it be the Academy has fallen into a pattern of taking his comfortable, outwardly effortless genius for granted?)

"Sully" begins with the immediate aftermath of the water landing, with Hanks "Sully" and his co-pilot, Jeff Skiles (Aaron Eckhart in one of his most measured and authentic performances), seemingly barely dried off being soaked in the icy waters of the Hudson when they have to face down a skeptical group of inquisitors from the National Transportation Safety Board, including Mike O'Malley as Charles Porter and Anna Gunn from "Breaking Bad", as Dr. Elizabeth Davis. From the

get-go, it's clear some on the panel believe Sully might have panicked and actually had enough engine power and enough altitude and time to get back to an airport. They ask Sully questions about how much sleep he had before the flight, when he had his last drink, and if he was experiencing any problems at home. They are looking for chinks in the armor of a man who was already being hailed as a hero in the media and who seemed a bit uncomfortable under the lights, but didn't say no to David Letterman or Katie Couric or plenty of other interview opportunities.

Eastwood directs with his usual economical style. (Even his longest-running films rarely seem to waste our time with overlong scenes of exposition, or unnecessary supporting characters.) We learn a little about Sully's love of piloting and his resourcefulness in times of crisis via a couple of flashback scenes, and we are introduced to a handful of flight attendants and rather thinly sketched passengers, including two adult sons and their beloved old pops, a young woman with a baby and a grown woman and her elderly mother. Mostly, though, "Sully" is about Sully. Hanks is so good he could play this character in a one-man show with nothing but a chair and a telephone onstage and it would be riveting. On the surface, Sully is a calm, cool, no-nonsense, self-effacing veteran of some 42 years as a pilot. But in the aftermath of the landing, he has visions of the plane smashing into Manhattan buildings, he has dreams of news reporters questioning his judgment, and he confesses his doubts and fears in intimate telephone conversations with his wife Lorraine (Laura Linney, who spends nearly every second of her screen time on the phone with Sully).



Eventually, at just the right time, "Sully" takes us through those harrowing, incredible 208 seconds when Flight 1549 is struck by those birds, and the engines burst into flames before dying out, and Sully and Skiles react in the cockpit, and the flight attendants repeatedly command, "Heads down, stay down, heads down, stay down!", as a commercial aircraft rapidly sinks in the skies above New York City (of all places) and eventually splashes down on the Hudson. The editing and the special effects and the performances are so pitch-perfect, this is as close as you'd ever want to come to being on that flight on that January day. "Sully" is an absolute triumph."

So go see "Sully", to enjoy and learn.

Oscar

AMA members may continue flying FPV

We are writing to address some recent confusion as to whether the new federal commercial drone rules (Small Unmanned Aircraft Rule Part 107) impact AMA members and model aircraft enthusiasts who fly for recreational and educational purposes. First, we would like to reaffirm that Part 107 does not change anything for AMA members. As an AMA member, you are exempt from the additional regulations in Part 107 as long as you are flying for recreational or educational purposes and fully complying with AMA's safety guidelines. This is what Congress intended when it passed the Special Rule for Model Aircraft in the 2012 FAA Modernization and Reform Act, also known as Section 336. And, as stated in previous communications, this also means you do not need any additional certificate to fly.

Second, for those flying first-person view (FPV), we understand that a recent Forbes article has made the issue of regulatory compliance even more confusing. In that article, the FAA was quoted as saying that as of August 29th, anyone flying FPV needs to obtain a Remote Pilot certificate and follow the provisions of Part 107. Although this is true for anyone who is not fully complying with Section 336, based on pending litigation with the FAA, we are advising AMA members that flying FPV with a spotter under the Special Rule for Model Aircraft remains acceptable as long as you continue to fly according to the AMA Safety Code and AMA's safety guidelines for FPV operations in [Document 550](#).

So, until the FAA completes its review of the public comments, publishes its conclusions and makes any further clarification/revision to the Interpretive Rule, the status quo remains in effect for AMA members. It should be noted, however, that this does not preclude the FAA from taking enforcement action against careless and reckless acts that truly endanger the national airspace. In the meantime, we encourage all AMA members to continue flying and enjoying our hobby as you have before, following AMA's safety guidelines and educational programming. Thank you for your patience as we continue to advocate and protect our hobby of flying model aircraft.

LIPO BATTERY PRIMER



By John Kauk

Reprinted from *Model Airplane News*, November 2016, pp.60-62

Every now and then I get a question from someone at an RC field, and it's nearly always the same question: "How many milliamps is that battery?" The first time I heard that. I didn't know how to respond because the question didn't make sense to me. So my "What do you mean?" response resulted in another question about how big the battery was or how much capacity it had. That I could answer.

The lithium polymer (LiPo) batteries that we use today in our electric RC aircraft are typically described using several standard electrical terms: "voltage" or "cell count"; "storage capacity"; and "current" or "discharge rate limits." Take a look at any LiPo label and you'll see at least these three items. These terms aren't unique to the batteries we use in RC; they're terms that are used in all electrical fields, so it's important to know what they mean and to use them properly.

VOLTAGE

A battery is composed of cells, which are connected in series and/or parallel to make up the battery. The voltage of any battery is determined by the chemical composition of the material within the battery's cells. Nickel cadmium (Ni-Cd) batteries have a reference, or nominal, voltage of 1.2 volts per cell. Lead-acid batteries have a nominal voltage of 2.0 volts per cell. A typical LiPo cell has a nominal voltage of 3.7 volts per cell.

A battery's total voltage is given as a multiple of the cell voltage, so six lead-acid cells make up the 12-volt battery we carry in our cars. A three-cell series-connected (3S) LiPo is labeled "11.1 volts," and a 6S battery's label is "22.2 volts." At a state of full charge, a LiPo battery's voltage will be near 4.2 volts per cell, and the cutoff, or minimum allowable, voltage is 3.0 volts per cell.

STORAGE CAPACITY

A battery's storage capacity (C) is described as the amount of charge that it can deliver over a period of time while staying above the cutoff voltage, and is basically determined by the size of the battery. In general, bigger LiPo batteries have more capacity, as do bigger Ni-Cds.

Capacity is measured in amp-hours (Ah) or milliamp-hours (mAh), and those are defined by the number of hours that a battery can provide a given discharge current. This means that a battery with a capacity of 1Ah is capable of providing a current of one amp for one hour before it gets to its cutoff voltage. It can also provide 500mA of current for two hours, or two amps for half an hour. Josh Barker of MaxAmps confirmed for me that the industry standard for labeled capacity is a one-hour discharge rate.

Storage capacity varies; it isn't a constant. Increasing discharge current will decrease a battery's capacity as will temperature extremes. It's also worth noting that we rarely use a battery's full capacity anyway as doing so might cause damage to it and shorten its lifespan. I time my flights so that I land when the battery is near storage voltage: 3.8 volts per cell. That leaves about 45 percent of the capacity unused, but it allows a safety margin for failed landing attempts and it's easy on the batteries. It's also easy on me because I don't have to charge or discharge to storage levels once I'm done flying.

USES OF "C"

In all batteries, capacity is used to define several other rates, such as charge and discharge rates, and this is where things can get a little confusing.

Charging a battery incorrectly can damage it, so manufacturers specify a safe maximum charge rate in multiples of C. With the LiPos we use, a 1C charge rate is almost always safe and easy on the batteries. Some manufacturers specify higher charge rates. For instance, Pulse Batteries and MaxAmps specify a 5C charge rate, so I'd be comfortable using that rate from time to time. For routine charging, I stick to the gentler 1C rate because I think that it helps the batteries last longer.

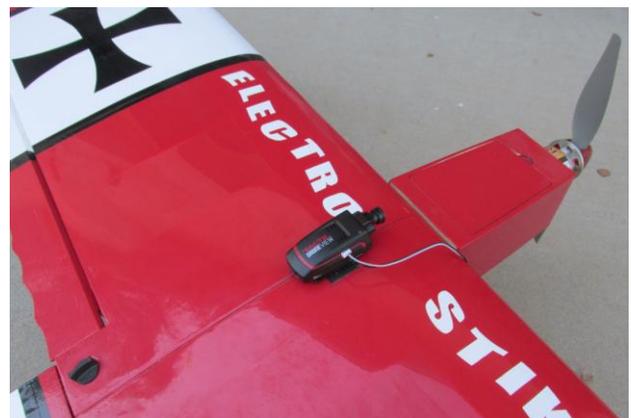
The term "C-rate" is used to define the discharge current for a battery. As with charge rates, this number is specified as a multiple of C, such as 20C. Sometimes the label will show a range, like 25-50C, and sometimes it will show continuous and pulse, or 3D-second rates. A continuous C-rate is the maximum discharge current that the battery can provide for the full discharge, from full charge down to the cutoff voltage, without damaging the battery. The 3D-second C-rate is the discharge current that the battery can supply for short-term pulses up to 30 seconds without damaging the battery. For a 5000mAh 25-45C battery, that means a continuous current of 125 amps and a pulse current of 225 amps.

How these maximum discharge currents are determined is a bit of a mystery to me. I've talked with people at various companies about it, and there isn't a consistent answer.

In most cases, the limits are defined by the cell manufacturer to prohibit excessively high currents that would damage the battery. Things like cell chemistry, cell construction, intercell connections, internal resistance, and wire size all have an impact on the final maximum current rating for a battery.

I try to set my models up with moderate current demands, for reasons I've discussed before. An advantage of doing this is that I don't have to worry about fanciful C-rates causing problems for me. If I keep my maximum current to 75 amps or less, a battery rated at 25C is sufficient for larger planes. They're less expensive and last a long time because I don't stress them much.

If you're interested in more general information about batteries, there are plenty of reliable sources on the Internet. One that I've found helpful from time to time is batteryuniversity.com, and MIT's Electric Vehicle Team has a nice guide to battery definitions as well (web.mit.edu/evt/summary_battery_specifications.pdf). A more in-depth discussion of LiPo lore that relies heavily on Internet forum sources is "Learning About LiPo Batteries" by Ken Myers, available at theampeer.org.



Pictured above is your editor's new Tactic Drone View Wi-Fi HD FPV mini camera. This little beauty was purchased at Hobby People for fifty bucks. The biggest advantages of this unit are small size and remote operation. It weighs in at one ounce, which means it can be used on smaller drones and aircraft. As it is mounted atop my Electro Stick, the cord you see coming out goes to the receiver and the camera can be operated by any three-position switch on the transmitter. The center position on the switch is "Off," one direction of the switch is "Photo" and the other direction is "Camera." Drone View can also be operated by Wi-Fi using the "DroneView" app from Google Play. The device can then be used as a FPV (First Person View) function to view what your camera is viewing and to take pictures or videos from the app. The Wi-Fi range is around 100 meters (330 feet) in an open area. It's a nice piece of equipment for a very reasonable price.



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