

# FORMULA FORUM



THE IF1 JOURNAL



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**COVER PHOTO**

Elliot Seguin moved up four places in 2014,  
qualifying fourth and placing fourth in the Gold  
with Wasabi Siren. This photo is from the Gold  
final. In July, Seguin flew Wasabi Siren 1700 miles  
non-stop from Mojave to Oshkosh along with four  
other aircraft, setting a point-to-point C1b (500-  
100 kg take-off weight) record of 260 km/hr in the  
process. *Photo © 2014 Jim Peterson*

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Reno National Championship Air Races held the Class Presidents meeting on Feb. 12th and 13th in the Stead airport administration building. Elliot Seguin, Bob Bement and I attended. Previous meetings had been held at a hotel in downtown Sparks. The Stead airport location for the 2015 meeting was a cost cutting measure, underscoring this year's theme of cost containment. John Agather is the new Chairman of the Board replacing Mike Major who completed his two-year term at the end of last year. Formula One had an outstanding relationship with Mike and we welcome and look forward to working with John. Just prior to our arriving at the Presidents meeting, NCAR named Michael Crowell President and CEO. A press release on their website talks about Michael's past responsibilities and accomplishments while at Coca-Cola.

We had frank discussion during the breakout session where only the three of us met with NCAR management, and during the general session where representatives from all the classes met together with NCAR management. Operationally we do an excellent job of providing a safe and thrilling race, and NCAR does an excellent job of providing a safe and organized venue, so very few operational issues were raised. One operational issue that was discussed however, involved low flying calls along the back straight. Management was made aware of our concerns regarding the inability of pilots, when flying from pylon three to four, to accurately gauge height given the rising terrain. We agreed to reemphasize the challenging topography, and they agreed to consider a guide pylon on the "hump".

Administratively, some changes were made and more are on the way. Last September Vito Wypraechtger, our 2013 Formula One Gold Champion, told me that he was presented with a different, lesser quality Breitling watch than the watch presented to the Unlimited Gold

Champion. I thought he was mistaken as previously each class's Gold Champion was presented with an identical Breitling watch. He was not. In 2013 Breitling made what I am told was a unilateral decision to downgrade the watches presented to the other classes, and to forgo NCAR's Reno home pylon logo on those watches. I explained that I thought this was a mistake from a relationship and marketing standpoint. I suggested that it signaled Breitling's lack of respect for the effort, skill, sacrifice, and determination of the other classes. Further, most if not all, of the Champions in the other classes have "Day Jobs" that expose Breitling and Reno NCAR to many other enthusiasts who have a passion for aviation, and the financial wherewithal to purchase a Breitling timepiece. I am often complemented and engaged by other airline pilots regarding the 2012 Reno Championship watch I wear at work. Just last week a B757 Captain had to return for a landing after his nose landing gear got stuck in an intermediate position. After he worked the problem which involved holding, manually lowering the landing gear several times to get a good down and locked indication, and returning for an uneventful landing; he was discussing the event with a group of pilots in Operations that I was not a part of, but overheard. A short time later I made a comment that indicated I had heard him talking about the event in Ops to which he replied, "I thought that was you I saw in Ops, but I wasn't sure until I saw your watch." He meant my 2012 Reno Championship watch! NCAR's management stated that unfortunately, their hands were tied, as it was Breitling's decision.

An additional change that will take place at NCAR 2015 will be that only the First, Second and Third place winners of the Gold, Silver, and Bronze final races will receive a trophy. The remainder of the field will receive only a plaque. Again

*Continued on page 4*



© 2010 Birgitta Nurmi

*Steve Senegal*

*We had frank discussion during the breakout session*

*Remember  
PRS is a great  
place to gain  
or improve  
race skills...  
and in addition  
to those who  
are required to  
attend, I highly  
encourage  
veterans to  
attend.*

I argued that everyone should receive a trophy, but their position was already set.

The total 2015 Purse for all the classes will remain the same as it was for 2014 as will the allocation among the classes. Approximate allocations of the purse will be: Unlimited 68%; Sport 11%; T-6 8%; Jet 5%; Formula One 4%; and Biplane 4%. Going forward the current year's purse will depend on the previous years revenue. That is, the total 2016 purse will be determined as a percentage of 2015 gross revenue. As an example, if the total revenue increases 10%, Formula One's purse would increase by \$1,967.54. A 10% decrease in total revenue would see a \$1,878.51 decrease in our purse.

As I alluded to above, the one thing that characterized this meeting was a focus on cost containment and the presentation of a well thought out budget, the likes of which the NCAR has never prepared before. My sense is that Management is focused on growing and perpetuating the races for generations to come. My concern is that those who actually put on "The Show," who are least able to bear any increased cost, will be asked to shoulder more and more of the cost cutting burden. At the same time we must increase our field of qualified Race Pilots and race Airplanes. If NCAR management can fulfill their promise of increased revenue, our purse should increase and help to defray some of your costs.

Because of your Board's efforts, we now have a race series with three races in 2015, and I have received several serious inquiries regarding two additional venues in the U.S., which we are exploring for 2016 and beyond. For those of you who do not know, the Lleida and Tunisia events contain a budget that provides for all covered expenses for all race teams at the those two events, as well as the expenses for the IF1 sanctioning committee. While Reno will always be the Grand Daddy of Formula One pylon

air racing, I am committed to expanding our ranks and venues.

Internally Formula One has had, and will see more changes as well. As you undoubtedly read in our last Formula Forum, Lista has indicated that she will be stepping down as Editor of the Formula Forum. I can't express enough, my and the Board's gratitude to Lista for the work she has done on your behalf. Not only has Lista worked tirelessly as Editor, but she has been your historian, archivist, and media contact / wrangler. Her departure will leave a void in our organization, but she has graciously agreed to help with the transition to a new editor. For all your work and from all of us, thank you, Lista!

Additionally, Grace took over as Webmaster earlier this year and found herself in the middle of our transition to a new website. She has done an outstanding job. She has had to learn a new website programming language and fix multiple glitches on the website, including member definitions and payment systems. While not perfect yet, it is better by leaps and bounds than the initial product. Also, as part of her responsibilities she is collaborating with our Promotions Chairman to migrate the Friends of Formula One Facebook page to our Website and new Facebook account.

Finally, PRS is fast approaching (June 17 - 20) and the PRS Application and Rules are up on the NCAR website. Remember PRS is a great place to gain or improve race skills and in addition to those who are required to attend, I highly encourage veterans to also attend.

The actual race application should be up in mid April, hopefully with the ability to enter your required data electronically. So take those racers out of the trailer and get ready to race!

Fly Low, Fly Fast, Turn Left.

—Steve Senegal

*Editor's Note: The following column was not included in our November/December issue because the issue was full with race coverage.*

It's almost Christmas. With foul weather and short days more time can be spent in the hanger or shop working on our race planes! Yea Right!!! First, a trip down to Turlock, Ca to spend time with my family for Thanksgiving. A quick trip to my old stomping ground, Sonora, Ca. Up the hill to Columbia Airport to visit, a short stroll from the car though the terminal and there it is: the same old picnic bench we sat around hanger flying with friends some 30+ years ago. The old couch and easy chairs still in position facing the ramp. A short walk out to the runway and I observe two young ladies preflighting a very clean C-150. To my left a C-150 busy giving rides to a young family, kids playing around, the family Waggener anxiously waiting their turn for a ride. A quick glance to the left and right my brother and I made a dash across the active. Standing on Runway 29 we watch the two young ladies in their mighty 150 fly overhead heading into a brilliant orange sky; South to parts unknown. Walking over to a Grumman S-3 CDF Bomber #76; sad to see it as a static display. I could remember very well watching #76 and many others flying overhead fighting fires close by and far away. While I am taking a picture of the S-3 with my POS-3 Galaxy phone I hear the roar of a propeller behind me. Looking south a beautiful Maule is base to final for Runway 29 "the grass strip". His roll out must have been all of 60 feet. *Oh, how I miss uncontrolled airspace!* Oh yeah, did I mention that it was a balmy 68 degrees, no wind, and the Christmas parade was in full swing downtown?

I wanted to share this trip down memory lane with you because it was here at Columbia Airport in 1983 I decided to take the time and go to Reno to see my first air race. Oddly enough I don't remember much about the races other than I knew I

had to come back. I have every year since then. I met Bob Bement and Bill Rogers in 1988. My first year with Formula One as a member of Tech was 1989. In the years following, it was obvious that IF1 was not just an organization, we were a family. Although we saw each other only once or twice a year, it always seemed like it was just yesterday. It was such a family unit; parents, kids, in-laws and anyone else who wanted to support the pilot. You knew who everyone was and you were welcomed by all. There were many times when I would be invited to 5 different trailers for lunch or dinner. It feels like some of this has gone away. What can we do to bring back the fun in Formula One air racing?

I know with time things change, but the principles guiding Formula One air racing should remain the same. The great thing about our class is that whether you are the gold race winner or "Tail End Charlie" in the bronze, you are all treated as equal. The rules apply to all equally. This coming year, please take the time to look at our organization and realistically offer ideas on how we can bring the fun and competition back.

Tammy and I would like to wish you all a Merry Christmas and a safe and prosperous New Year.

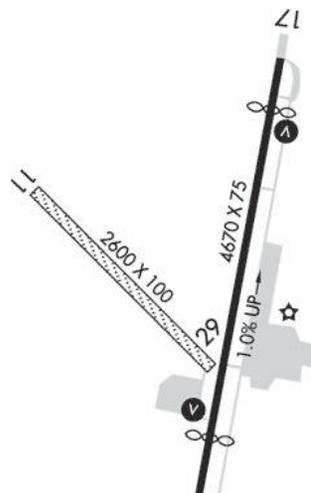
**Tom DeHart, IF1 Tech Director**



Tom DeHart

© 2012 Bill Rogers

*Although we saw each other only once or twice a year, it always seemed like it was just yesterday.*



*Columbia Airport (O22) hasn't changed much since Tom's visit in 1983. Rwy 11-29 is still grass, and we can still imagine the CDF firefighters coming and going.*



Jeff Zaltman

*I'm very pleased with a lot of the early successes and signals we're receiving on many fronts.*

Firstly I would like to thank Lista Duren for the extraordinary and devoted service she offered all of us through her diligent – and not easy – work developing the Formula Forum. It will take a big effort from a number of us to keep up the pace. Thanks Lista!

My job of promoting Formula One air racing is easy on one hand—because it's awesome. But it's also difficult because it takes time to kick in. But I'm very pleased with a lot of the early successes and signals we're receiving on many fronts. We have many new initiatives taking root and new interest from journalists and requests to host more races, not to mention the peeked interest of potential new members—our principal aim.

With the help of Grace Sturgess, the IF1 Board, some early administrators (and a bit of hand-holding from my wife, Sinzy) IF1 launched a great new and very active Facebook page, which has already approached 2,000 likes! These are fans following our updates and spreading the word about our sport. If you're not connected yet, please look it up.

The IF1 Board has been making progress after a lot of positive effort to plan and prepare for the new international air races under the title "Air Race 1 World Cup" in Tunisia and Spain. 19 pilots have signed up! It is exciting that the IF1 pilots will be out in force and accompanied by a field of very capable contenders from 6 nations! See below for a list of competitors for the first world title in our sport:

Air Race 1 World Cup Competitors				
Pilot Name	Race #	Aircraft Name	Aircraft Model	Country (Pilot)
Thom Richard	1	Hot Stuff	3M1C1R	Sweden
Trevor Jarvis	2	Silver Bullet	Shoestring	England
Christian Guilie	6	Arletty II	Arletty II	France
Des Hart	11	Hart Attack	Cassutt IIIM	Scotland
Dave Holmgren	15	Last Lap Player	Cassutt IIIM	USA
Stanislas Damiron	19	Buzz Buzzard	MP207 Busard	France
Tom Watkins	20	Pooder	Cassutt IIIM	Canada
Bernard Marichy	25	(tbc)	MP205 Busard	France
Guy Chereau	31	L'Herrengrie	Cassutt IIIM	France
Mike Mundell	33	Second Wind	Cassutt IIIM	USA
Stephen Partridge-Hicks	40	Miss USA	Cassutt	England
Jay Jones	45	Quadnickel	Cassutt	USA
Vincent Martinez	46	Aquilon	Cassutt IIIM	France
Terry Gardner	53	Kermit	Cassutt	England
Jim Jordan	54	Miss Min	Cassutt IIIM	USA
Patrick Gajan	55	Le Coyote	CP80	France
Philip Goforth	69	Knotty Girl	Stratocaster	USA
Steve Temple	87	Madness	Boyd GR-7 Panther	USA
Kent Cassels	99	Margaret June	Cassutt IIIM	USA

Next year we expect this list to be even longer. I am approached regularly by people who want to enter the sport

*Continued on page 7*

having heard about us recently due to the increased exposure and awareness. This could have a huge snowball effect on membership if we all nurture it and welcome new talent and aircraft. My goal is to help make Formula One the strongest race class in the world. A long way to go, but the green flag is waving in front of us!

Please send me all your ideas for growth and promotion. Each one of you is on the Promotions Committee. If you'd like to take a more active role on the Committee please ask me. In the meantime, don't forget to mention the great things you do in Formula One air racing to everyone you meet!

*Jeff Zaltman, Promotions Chairperson*



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Heat 1A at Reno 2014. Top to bottom: #11 Endeavor, #3 Miss U and #87 Madness.

## Editorial

by Lista Duren

Please welcome Randolph Bean to the official staff of the Formula Forum as your new Managing Editor.

As a member of the air race press in recent years, Randolph has contributed coverage of IF1 teams, planes and awards to the Formula Forum. As an A&P, experienced on Thom Richards' race teams, Randolph brings a valuable technical perspective to our publication. His article on Paint Systems and Finishes in this issue is the first in a series of technical articles written for the race plane builder.

Please support IF1 and the Formula Forum by sending your team's news items to Randolph for publication and communicating your requests for content. Your participation is required for success.

Farewell and thank you for the opportunity to participate in the IF1. I have been following the class for 14 years, and editing the newsletter for 7 years. I have learned a tremendous amount from this brilliant and vibrant group.

*Lista Duren, Outgoing Editor*



*Lista Duren*

*Randolph brings a valuable technical perspective to our publication.*

### **2015 IF1 Calendar**

- April 18-19 **Mojave Experimental Fly-in** (watch <http://www.mojaveflyin.com> for information)
- April 25 **Society of Air Race Historians** Annual Meeting. Dan Chrapczynski, IF1 and Air Race 1, is one of the speakers.
- May 1 Deadline for submitting **PRS applications** (watch [http://www.airrace.org/for\\_pilots/rookie.php](http://www.airrace.org/for_pilots/rookie.php) for the 2015 application package)
- June 7 **Air Race 1** race in Monastir, Tunisia
- June 17-20 **Pylon Racing School** at Reno Stead Field
- June 28 **Air Race 1** race in Lleida, Catalunya, Spain
- Sept 16-20 **Reno Air Races** (watch [http://www.airrace.org/for\\_pilots/racer\\_application\\_info.php](http://www.airrace.org/for_pilots/racer_application_info.php) for the 2015 application)

*We have fought over the King's Cup every year since 1927, bar the odd war here and there.*

In the UK there is a long history of air racing, much of it of the long distance variety. As recently as 2001 teams battled each other for honours in the London to Sydney air race. Handicap air racing over long courses in the UK is also well known; we have fought over the King's Cup every year since 1927, bar the odd war here and there. However, very little is known about Formula One air racing in the UK.

The concept, imported from the USA in 1971, immediately became popular and its administration was greatly assisted by the then brand new Civil Aviation Authority, who granted the crucial dispensations and permissions without delay. The races quickly became part of the air show scene and Heineken sponsored the series in 1973, supplying a purse of £4000 and probably a lot of beer. This was enough to live on comfortably, and would have bought you a house at the time. The UK Formula Air Racing Association (FARA) was also formed around this time and several of the original members are still with the association now. In its halcyon days of the 1970's and 80's FARA was able to fill a 15 minute air show slot with a race and do it reliably too, rarely overrunning or starting late. UK teams were also regularly invited to France to race against the French teams.



#66 White Lightning, Andrew Chadwick's mount, recently approved for flight following an extended period of engineering paperwork.

Safety records throughout this time were enviable. There were no fatal accidents during races. The only fatal accident was during qualifying rolls—not bad going for a couple of decades of seasons with 4-6 race events each year, though still one too many, and also the foundation of FARA's aversion to qualifying rolls at low level.

Through the 1990's the sport began to decline, partly through lack of new racers turning up, a lack of sponsors, and increasing regulatory oversight by the then Popular Flying Association, the body delegated airworthiness responsibility for home built aircraft in the UK. Rather than being trusted to do their own thing, if a racer now wanted to make a new wing root fairing they would have to design it, submit the design to the PFA for approval along with a fee and wait months for approval, then make it and get it inspected and signed off; – not exactly conducive to developing a race plane.

Happily, Formula One air racing is now undergoing a renaissance in the UK. Thanks to the efforts of Jeff Zaltman and his Air Race 1 vehicle, we now have the nucleus of activity needed to draw out more and more racers. This year we have another two racers who will be active, and there are several more aircraft that are being rebuilt with the intention of racing. The Popular Flying Association's successor organisation, the Light Aircraft Association is also backing us. Although the regulatory burden is still there, they are enthusiastic supporters of air racing and have greatly accelerated their handling of racers' paperwork.

So what does the future hold for pylon racing in the UK? There is a strong possibility that we'll be developing the sport into more categories that will run on the standard F1 course. I'll explain those in more detail in the future.

Safe flying and warmest regards from all at FARA,

**Martin Luton, CEO of FARA**

My name is Steve Tumlin. I'm the new Technical Rules Committee Chairman. Let me start off by saying thank you for your vote of confidence. I will strive to do my best at what you have appointed me to. I'm very honored. My agenda is two-fold:

**Technical Rules.** First, I would like to ask the membership to contact me if you would like to see any technical rule changes, or amendments. To act on these, we need to have them submitted to the board, then submitted to the members for a vote. Changes approved this year won't take effect until 2016.

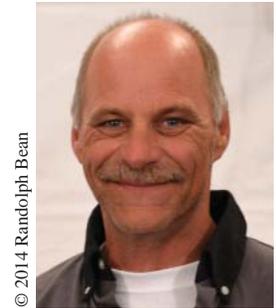
**Air Race 1 Pilots and Planes.** Second, we need your help to bring European Air Race 1 pilots into our deep tradition. I'm trying to compile a list of potentially available aircraft and/or pilots. On a trip to Europe and the U.K. in November, I talked with several pilots who are interested in racing at Reno. How would they go about racing in America? They wanted our opinion on subtle differences between aircraft. Would

they pass tech? Could they rent, lease or buy aircraft in the U.S.?

We have many IF1 race planes sitting in garages or buried in hangars. There is a potential flood of pilots in Europe who want to race in the Air Race 1 series and they want to fly here as well, but it is cost prohibitive to ship their aircraft here for four days for PRS. Let's knock the dust off of our planes and get them back into the air. Let's help these new pilots get qualified here at Reno—at PRS—and be able to race in the Air Race 1 series coming up in Europe, and then back here to race at Reno with IF1 in September for the National Championship Air Races.

Break out your aircraft and be a part of world history and race in Air Race 1 as well. These are exciting times, my friends. Thanks for helping out. We need this for you, me, us, one big dysfunctional family!

*Steve Tumlin, Tech Rules Chairperson*



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*Steve Tumlin*

*Break out your aircraft and be a part of world history and race in Air Race 1.*

## IF1 Class Sponsor: Aircraft Magneto Service

Got Mags? Got Spares?

Don't wait until the last minute...

We all know what it is like to have a mag go bad and not have a spare ready, or have to go borrow one. Aircraft Magneto Service, located in Seattle, Washington, has offered to inspect, test, and overhaul your IF1 race mags for just the cost of parts. This is a GREAT deal. You get the confidence of knowing that your race mags are professionally inspected, tested, and overhauled to the most current standards and specifications.

The Catch? (there's always a catch) Aircraft Magneto Service asks that you display their logo decal on your aircraft. These are great looking decals, along with great service. Do your mags a favor—get them overhauled today, before the race

season starts. Contact Clifton Orcutt at 206-768-3099 for further details. You must provide your IF1 race number and aircraft name.

I have used them with great satisfaction and they provide a quick turnaround time. Visit their website:

[www.aircraftmagnetoservice.net](http://www.aircraftmagnetoservice.net)  
[www.aircraftmagnetoservice.com](http://www.aircraftmagnetoservice.com)

*Steve Tumlin*





© 2013 Zach Whalen

**Randolph Bean**

*All paint systems share the same basic process.*

Aircraft are normally painted, both to protect them and to make their appearance more pleasing. The many different types of materials used for finishing fabric, wood, plastics, fiberglass, composites and metals include primers, wash primers, metal treatments, lacquers, enamels and other coatings.

All paint systems share the same basic process: prep, prime, and top coat, as follows. A surface must be properly prepared to receive the coatings. This may require etching to provide something for the components to grip. The first coating is a primer of some sort, whose job it is to provide a surface that holds to the base and receives the colored upper coats well, while giving them an even better surface to grip. The top coats provide the color, shine and durability to the overall finish.

Dope and fabric is another world to itself, to be addressed in a later article. Equipment can be complicated based on the system chosen, so I refrain from too many details about it also. Painting is often misunderstood down to the most basic details, so we'll take a look at the basics of them here to help everybody get a better understanding of what they are and how they work.

## **Primers**

Primers and wash primers are undercoats applied to a metal to inhibit corrosion and provide a good base for the top coat of color. Primers include fill primers and regular primers. The difference is in the names; a fill primer is thick and provides the ability to fill some surface imperfections, while a normal primer is thin and doesn't fill imperfections. The thicker primers require more sanding, while the regular ones require little to be ready to receive a top coat. One thing to note for many primers is that they are not waterproof on their own. In fact, they are often porous to allow a top coat to soak more

deeply into them, thus providing better adhesion for the finish. This means that if they are applied and allowed to sit without a top coat, they can and will trap moisture underneath them and actually create corrosion. Newer primers often have a more robust compound that does provide a moisture barrier. Surface preparation before priming can include etching and alodine treatments to insure proper adhesion of the paint system to the surface being painted. It's always best to speak at some length to your supplier about details of the system you have chosen to use.

Primers are divided into wash, zinc chromate, red iron oxide, grey enamel undercoat, and urethane types. Each has their own specific purpose and formulations that are usually part of an overall system that shouldn't be mixed haphazardly between brands and types. Wash primers are thinned to a very light consistency that makes a layer about .5 mil thick. Some include etching or metal conditioning agents such as phosphoric acid to create better adhesion while protecting the metal from corrosion. Another wash primer is zinc chromate based and is formulated for use with urethane primers and enamels. In simple terms, a wash primer is a preparation to help other primers do their job better. Regular primers include Zinc Chromate, which is used on aluminum, aluminum alloys, magnesium, iron and steel. It is thinned with toluene for brushing and spraying. Red iron oxide primer is thinned with petroleum thinners and used on iron or steel. Grey enamel undercoat is a lacquer type primer and used under lacquers, synthetic enamels or acrylic enamels. It is thinned with nitrate lacquer thinner and works well for providing a very smooth surface for topcoats. Epoxy chromate primers are fast drying, heavy duty, chemical and solvent resistant. They are two part formulas that require a catalyst to be added to a base formula to start the drying process. They can be used on

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steel, zinc coated metals, aluminum, fiberglass and composites to provide corrosion and chemical resistance. They are most sensitive to following directions, as the various components to the system require precise measurement to work properly.

### **Paints**

Most paints provide the color and shine to the overall finish. Often I ask people if they “Know how paint works”? I’ve yet to receive a simple answer, so I share what I learned from my first paint instructor: “Colored solids are held in suspension in a liquid of some sort. These liquids “melt” the solids and give them something to float around in. Once they are sprayed on a surface, the liquids dry and leave behind the melted solids which form a hard layer.” While there are a number of types of paint, they all have the same basic four components in them: Pigment, binder, solvent and additives. Pigment provides the color and durability. It may also improve the adhesion of the paint. Binder holds the pigment in liquid form, makes it durable and gives it the ability to stick to a surface. It is the skeleton of the paint job. Solvent dissolves the binder and carries the mixture through the spray gun and to the surface being painted. Most solvents are derived from crude oil. When used with lacquer, they are known as thinners. When used with enamels they are called reducers.

Types of finishes include lacquer or enamel. Each has its advantages and disadvantages. Lacquer dries quickly, but requires many coats and much rubbing with a compound or polishes to produce a glossy coat. Enamel dries with a gloss and requires far less polishing. Since it dries slower, it is more susceptible to dirt and dust settling into the finish as it dries. Lacquers are more easily damaged by solvents, while enamels resist damage much better overall. Lacquers were originally developed in the Orient for use on woods,

and are good for both metal and wood. They are considered to be easy to work with. Some have special additives to better resist fuel and hydraulic fluid damage. Enamels were developed as alkyd enamels and have evolved into present day acrylic enamels. They resist scratches and other damage well. Enamels require more skill to properly apply, as they come in a variety of formulas; including one and two part systems. They can be formulated to provide more durability, heat resistance and weather resistance, depending on the requirements of the finish. Polyurethanes are grouped under enamels and are usually a two part formula. They have a base portion including the pigments and a hardener that are mixed to chemically create the drying process.

### **Thinners and reducers**

Thinners and reducers are used to reduce the viscosity of the paint mixture to allow it to properly flow through the spray gun and onto the surface being painted. Temperature and humidity affect the spraying of materials and are compensated for by proper addition of thinners and reducers. If the mixture is not properly created, the finish may dry too fast, produce surface imperfections such as “Orange peel” or even sag and run.

### **Additives**

The final component of paints is called additives. They make up no more than 5% of the solution and perform a variety of vital functions. Some speed up or slow down the drying time. Others can increase or decrease the gloss of the final system. Still others perform a combination of functions such as eliminating wrinkling, providing faster cure times, and improving chemical resistance. Additives that speed up the cure time are known as hardeners. Those that slow it down are called retarders. If they reduce the gloss they are called flatteners. Since paint dries into a hard shell,

*Often I ask people if they “know how paint works”? I’ve yet to receive a simple answer.*

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it can sometimes crack when applied to a flexible surface. There are additives that allow the paint to remain somewhat flexible once dried to prevent this kind of damage.

### The Big Picture

Paint technology has advanced dramatically in the last few decades, but many of the newer systems are only now beginning to be used in aviation. Older systems required drying times between coats, and often preparations of some sort between each layer. Modern systems include “Wet on wet” systems that must be sprayed while the preceding surface is still wet. These systems actually create a strong bond with less material as they mix together as they dry. They include a primer, a base coat of color and a final clear coat to produce the gloss. Electrostatic systems place a charge on the part being painted and attract the oppositely charged paints being sprayed at them to create an almost indestructible bond. Older systems were mixed by measured amounts of fluid to create the proper mix, while many modern systems use a sensitive scale and a chart to mix them by weight alone.

So clearly, paint systems are complicated and far beyond the skills of the normal person, right? Not at all! There are many ways to get started in painting. My best suggestion is to search out a local community college and enroll in a paint and body course. You’ll have use of school

equipment and you’ll only be required to pay for materials used on personal projects. It is far cheaper than buying all the equipment and having to try it all in your hangar. Plus, there is actually a teacher to guide you through the learning process. Many schools even have a paint booth as part of their programs, allowing you to paint complete large size projects there. Next is your local paint shop. They can tell you about all the available systems and help you determine what suits your project, tools and skills best. They can also advise you about local laws in regards to painting. State to state laws vary immensely and products available in one state may be forbidden in another (OK, in California...). Paints produce something called “Volatile Organic Compounds” when sprayed, which is a fancy term for “Nasty stuff that is bad for you to breathe”. California requires you to keep logs of what you spray, and to not exceed a certain amount of paint a day. Backyard painters usually aren’t held to task for this, but if a grumpy neighbor doesn’t like the smell it can lead to big problems for you. Finally, there are your friends. In IF 1 there is a large group of DIY people who take on and master any task. Look within your unique community for advice and guidance on painting and you’ll be surprised at how much knowledge is out there.

Remember the credo for beginning painters, “That’s OK, sand it off and do it again.” Have fun!

*Remember the credo for beginning painters, “That’s OK, sand it off and do it again.” Have fun!*

Race start, Heat 1B, Reno 2014.



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# Bill Brennand, Air Racing and Other Aerial Adventures

by Bill Brennand and Jim Cunningham

Most of us know a little about Bill Brennand, for example, that he won the 1947 Goodyear race in a plane called “Buster” and maybe that Buster used to be called “Chief Oshkosh” and that it is now hanging in the National Air Museum. Until recently, that’s about all I knew. I didn’t know that Brennand learned to fly with Steve Wittman; I didn’t know that he flew in 60 races during his career and won half of them; I had no idea what he did in the half-century after he stopped racing in 1952. Bill’s story in the book *Bill Brennand: Air Racing and Other Aerial Adventures*, told to and written by Jim Cunningham, changed that picture.

Bill grew up as a farm boy in rural Wisconsin near Oshkosh. In 1931, when Bill was about six, Steve Wittman took over the Oshkosh airport and laid out a practice race course that went over the Brennand family farm. Bill watched Wittman flying 200 feet off the ground in Chief Oshkosh and Big Bonzo. He admits that his dreams of being a race pilot started back then, but he didn’t tell anyone. At seventeen, Bill and his buddies started hanging around at the airport, hoping to learn how to fly. A year later, with Steve Wittman himself as his Designated Examiner, Bill passed his flight test, and checked out on every plane that Wittman owned.

With hay fever making farmwork unpleasant, and his Army farm deferment making other employment impossible, Bill hung around the Oshkosh airport as much as he could, helping out Wittman, getting paid in flight time, and learning his trade from the Master. In 1945, Wittman suggested that they rebuild Chief Oshkosh, hanging from the ceiling since its hard landing in 1938 “just for fun.” They straightened the fuselage, installed a new set of wings, moved the engine forward, and the pilot back. With Wittman’s blessing, Bill taught himself aerobatics in the rebuilt plane, now called “Buster.” For his day job, Bill provided

flight instruction under the GI Bill, taking on problem students that Wittman’s other three instructors couldn’t handle.

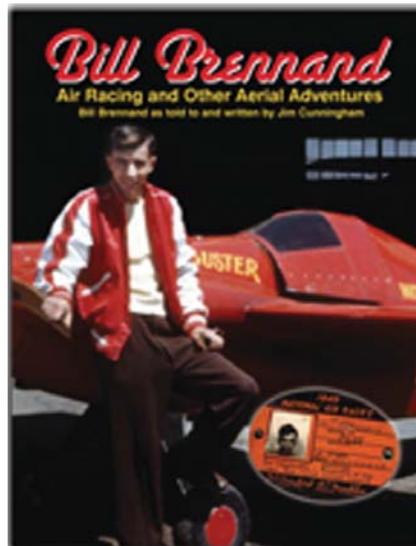
In 1947, when Goodyear announced their sponsorship for a new class of midget racers for the Cleveland Air Races, Wittman and Brennand set out to rebuild the old racer once again: another set of new wings, a new cowling, and a Continental C-85 engine. Wittman was flying a modified P-63 King Cobra in the races, and asked Bill to fly the midget. At only 100 lbs, they figured that Bill would have a major advantage in the racehorse start. With 30 minutes of flight time in the modified plane, Bill set off for Cleveland, flying around Lake Michigan, via Chicago, with one gas stop on the way.

*Cleveland, 1947. I am strapped into Buster, a tiny red airplane that one wears when they fly it. It was built from the hulk of a race plane Chief Oshkosh, and has not flown in a race since it crashed in 1938.*

Jim Cunningham’s book tells the story of an aviator with many careers: racing planes, running an airport, restoring a classic Stinson Tri-Motor, and building what became the EAA Seaplane Base near Oshkosh. Only one of these careers made it to the Smithsonian, but the book helps us understand how they all fit together.

*Book Review by  
Gene Hubbard*

*At seventeen,  
Bill and his  
buddies started  
hanging around  
at the airport,  
hoping to learn  
how to fly.*



*Bill Brennand, available from Airship International Press, tells the story of the first Goodyear Race winner, from growing up on the farm in Wisconsin, through making history at Cleveland, restoring a classic Stinson Trimotor, and building what became the EAA Seaplane base near Oshkosh.*

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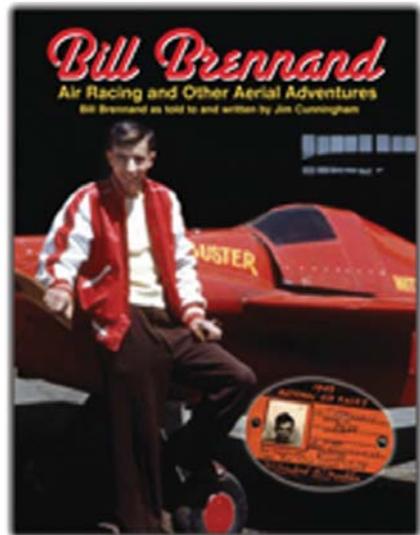
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## AIR RACING BIOGRAPHY Bill Brennand, Air Racing and Other Aerial Adventures

by Bill Brennand and Jim Cunningham

While working for air racing legend Steve Wittman in 1947, Bill Brennand won the Goodyear Trophy at the National Air Races without ever flying a practice course and outflew veteran air race pilots. In the years that followed he flew many more races and was in the winner's circle over half the time. This is a fascinating story of an Air Racing Legend and EAA Pioneer!

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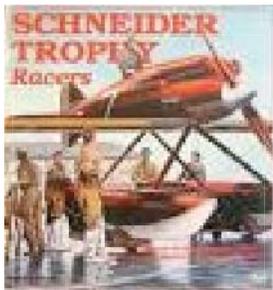
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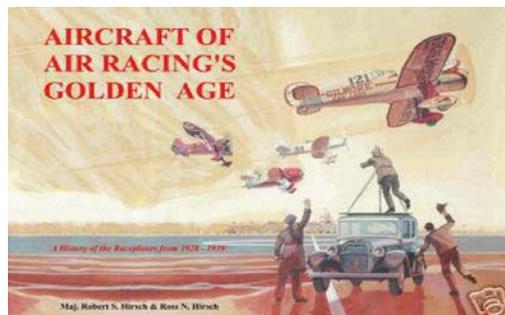
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