

A two-time world
and two-time
national champion
CL Stunt design

by Bill Werwage

USA-1



Les McDonald holds the USA-1 while Bill tunes the SuperTigre .46 for a practice flight at the 1984 World Championships.

"IF YOU BUILD an airplane that's bigger than you are, sooner or later it will whup you!" I uttered those words in a weak moment during some high-wind practice time, and I've come to regret it. Why? Because at the time I was flying my USA-1—a model that was more successful for me in competition Control Line Precision Aerobatics (Stunt) flying than any other I have designed so far.

When I first saw Lew McFarland's Shark 45 (originally named the Humbler) fly in 1960, I was sure that the larger Stunt airplane would someday replace the smaller .35-powered models most of us were flying at the time. I was also sure that this changing of the guard wouldn't happen for me anytime soon. Why? The answer is simple: power.

There was really only one engine that could pull an airplane the size of the Shark at all effectively, and that was the K&B Torpedo .45. It was fairly powerful and light, but we lacked the knowledge about propellers to fully utilize it. At least that's how I felt. I've always believed that the power system is at least half of the equation in our quest to come up with the ultimate Stunt model.



This is how the original USA-1 appeared at the 1969 Nationals. It was soon to receive an entirely new look!



Bill prepares for a practice flight with the refinished and restyled USA-1 in late 1969 at his home field in Berea OH.



The 1980 version of the USA-1 featured a swept-forward trailing edge and a thicker airfoil—not Bill's favorite!

The K&B was a good engine, and I used it for my first ventures into the world of "Big Stunt." The first model I designed around this power plant was the Mariah, which was essentially an enlarged Arcs. It had a 57-inch wingspan, which was enormous by the standards of the day; 53-inch-span Stunters were considered large then.

The Mariah in its original form was a complete dog. The airfoils I used produced a wing that had a too-far-aft center of pressure, and the model was prone to stall severely. I ribbed this airplane with a farther-forward high-point airfoil, and it ended up flying quite well, even with the extra weight.

Looking back, I realize that I overcompensated for the larger airframe and designed a model that had too much structure. I used wood thicknesses that were proportionately larger than those I used in my smaller .35-size models. After the lessons I learned from the Mariah, I rethought this and started to design with the same-size materials I used in the smaller models.

The next large Stunter I designed was the Super Ares. It was bigger than the Mariah, with a 60-inch span, but finished 2 ounces lighter. The Super Ares flew well right off the board, and the first day at the field with it I knew I'd made some gains.

The Super Ares featured long nose and tail moments. The nose was 10.5 inches long (measured from the leading edge of the wing at the root to the backplate of the spinner), the tail moment was 17.75 inches (measured from hinge line to hinge line), and the wing root chord was 11.5 inches.

When you consider that the Ares' corresponding moments were 8.625 inches for the nose, 13.625 inches for the tail, and 10.25 inches for the wing root chord, you get an idea of how large this new model appeared.

At the same time I was building that Super Ares I was building a large model I called the "Vulcan" (not to be confused with my earlier .35-size Vulcan from 1955). It featured a higher-aspect-ratio wing and aesthetic shapes that were later incorporated into my Juno. These shapes were originally inspired by Ray Marlo's Pegasus, which I first saw in 1956.

The Super Ares came out on target weightwise, but the new Vulcan suffered from a faulty trigger on my spray gun; I got carried away with some neat-looking red metal-flake paint, and the result was a 55-ounce model. Actually it didn't fly all that bad, even at the higher wing loading, and I even won a few local Stunt contests with it. The trigger on the spray gun was repaired and I refinished the model. The second time it came out at 50 ounces, and I renamed it Super Ares.

Both Super Ares had relatively thick wings. The first was 2.25 inches thick at the root, and the second was 2.375 inches thick. The first flew well with the K&B for power, but the second, with the thicker wing, needed more power.

Today we have engines that would have made the second Super Ares an excellent airplane, and I'm seriously considering building a replica of it for Classic Stunt competition. And I'm currently having my spray-gun trigger serviced.

In stock form, the K&B .45s I used in those days were good. Not being one to leave well enough alone, I started an engine-development

USA-1

Type: CL Aerobatics

Wingspan: 61.5 inches

Engine: SuperTigre .40 or .46 (See text.)

Flying weight: 51 ounces

Construction: Balsa and plywood

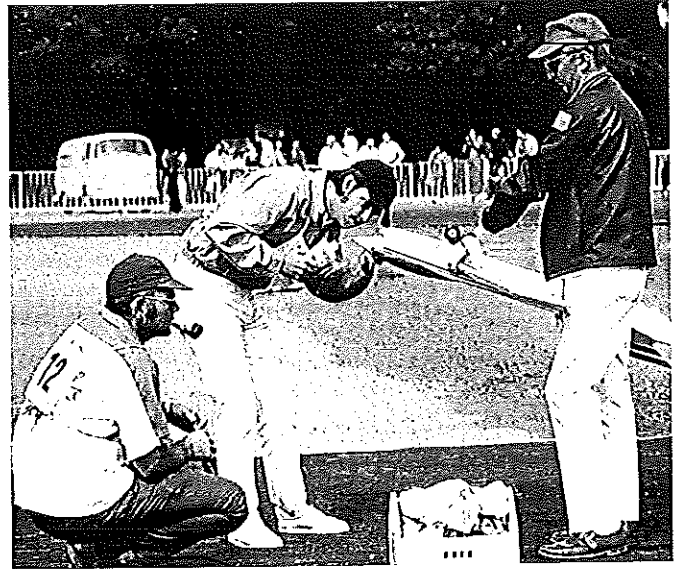
Covering/finish: Silkspan and modeling dope

program that included opening the stock venturi, cylinder-head work, and an extremely serious tipping of the nitromethane bottle! I was eventually running these engines on as much as 45% nitro-content fuel. Boy, did my program smell good!

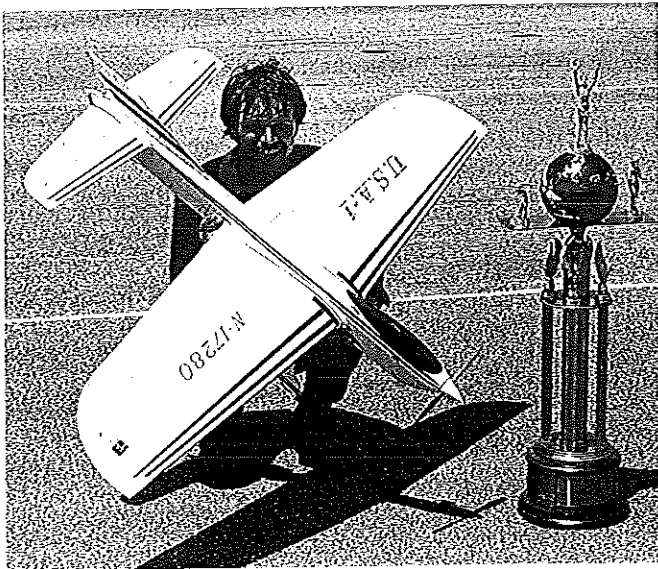
The K&B reacted favorably to the addition of nitro and the rest of the changes I'd made, but it was nearing the limits of what I could get out of it. As I mentioned, the first Super Ares flew well with this combination, but the second was marginal, I guess because of the slightly thicker wing. Again, I had reached the edge. I needed an engine from which even more power could be realized, but it also needed to be *light*.

I briefly tried the Veco .45, but it was too heavy and behaved "angrily." Some other modelers were beginning to have success with this engine, but I never got what I wanted out of it.

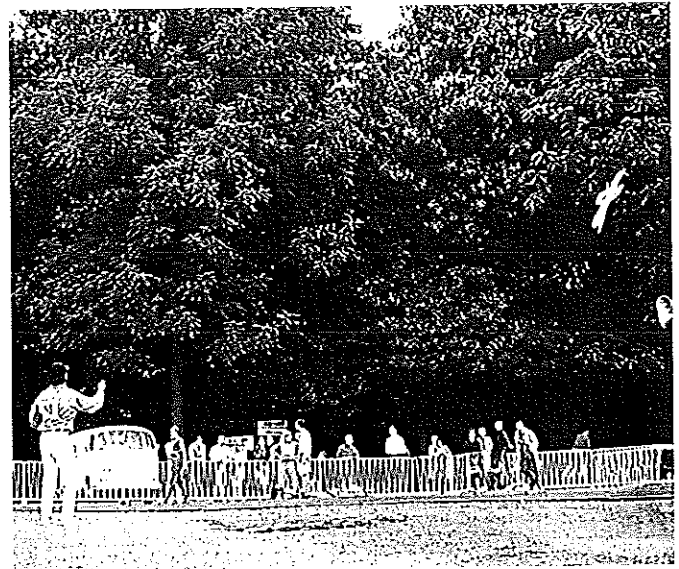
In the near past, Dean Pappas and I were discussing the never-ending search for ever more power, when it hit both of us that there has always been the hidden problem. Every time we find or develop an engine with more power, instead of being happy that we can properly power the models we have, we end up building even larger models to use the excess power, and the whole problem begins anew. Part of the



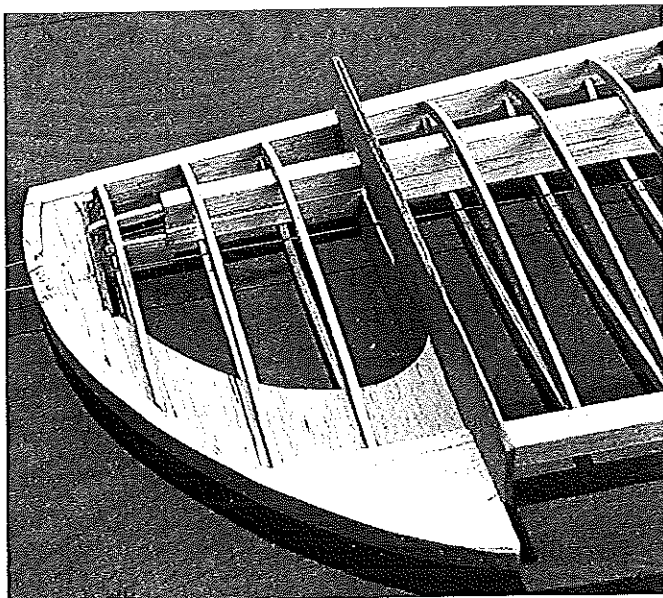
Bill prepares to start USA-1 at 1970 World Champs in Belgium. Teammates Bob Gieseke (L), Gerry Phelps help. Laird Jackson photo.



Bill after winning 1981 Nats with USA-1. He also won 1971 Nats and 1970 and 1972 World Champs with it. Bob Hunt photo.



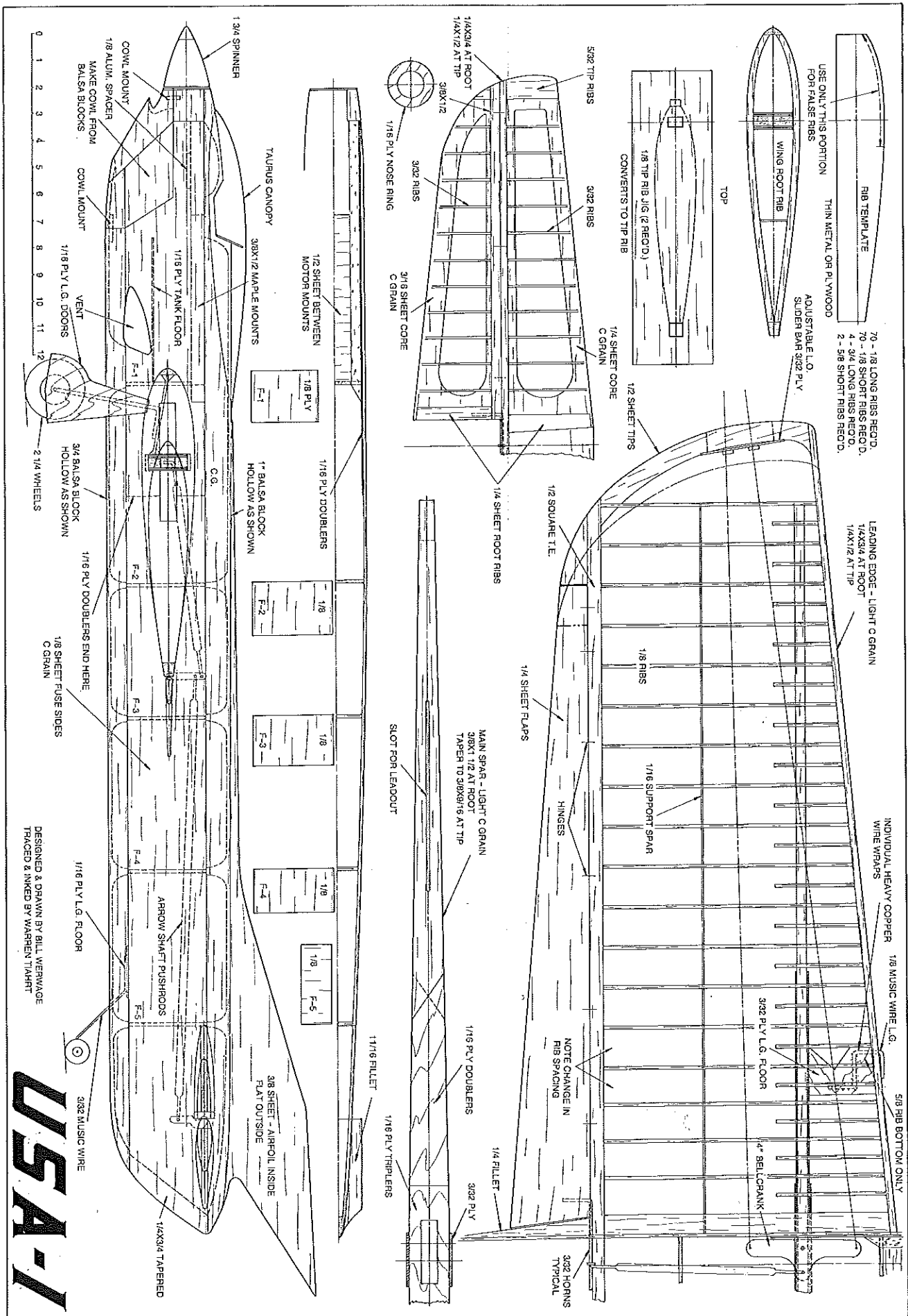
Graceful USA-1 scribes winning flight in Belgium. This was first World Champs Stunt win by a US pilot. Jackson photo.



Look at how wingtip assembly was built on I-Beam wing structure. It's light but strong construction. Werwage photo.



Bill and Bob Gieseke confer at 1974 World Champs in Czechoslovakia. Bob won; Bill finished close second. Jackson photo.



USA-1

following will certainly bear *that* out! Yes, hindsight is at least 20-20.

The Super Ares was never as well known as the original Ares, the USA-1, or any of my other competition regulars. This is sad because it was, and still is, a great airplane, and I still like to fly it. Why wasn't it as well known as the others? Because it was developed at almost the same time I was entering the Army, and I could not get to the large contests or practice on a regular basis.

I did continue to work with the model as best I could and even teamed with Steve Wooley to develop larger and longer tail assemblies. This was a marginal step forward at the time, and we may have even gone a bit overboard with this technology today, but at the time it seemed to improve our models' flying characteristics.

I did get out to several local meets with the Super Ares, and I even got to the 1963 Nationals (Nats) to compete with it. Even with the less-than-ample practice time, it managed to capture second place in the Open Stunt event, just behind a man I believed to be selling ice cream at the field. Bob Gialdini won that contest flying his futuristic Sting Ray.

Bob showed up at the 1965 Nats with a much larger version of that design called the Eclipse. It was one of the few egg-bearing models of the time. (Are you still with us, Bob?)

The Eclipse did serve, along with a couple others, to convince me that an even larger and more jetlike Stunt design was in my future. The others that drove this thought home were

Jerry Worth's Apterix and Dave Gierke's NOVI III. These models came shortly after the Eclipse, but they cemented that thought. An idea was forming.

The USA-1: At the 1968 Nats I practiced with Jerry Worth, who was flying his Apterix. Jerry was using a SuperTigre .40.—an exceptionally *strong* SuperTigre .40. Ahem. This package was eye-opening, especially in the wind. The Apterix was large, with a 62-inch span, and it had a fairly thick wing with a blunt leading edge.

At this point I had decided on my new large design and had even framed up a wing. However, that wing was much thinner than the Apterix's. I felt that a thinner wing would "tow" easier through the wind and allow the SuperTigre .40's (that I had tested and decided to use) extra horsepower to be put to better use while maintaining the look of the large, white jet.

I first flew the USA-1 at the 1969 Nats. It was painted white, with purple, two shades of blue, and black trim. It also had a subtle lace effect that many found attractive. I really liked this model, and apparently so did the judges—right up to the last flight of the finals. I had won the first round of the finals but had to fly early in the second round, and the scores just kept going up. The balloon left without me!

A month later at that year's Fédération Aéronautique Internationale (FAI) Team Trials, the balloon was grounded and I was fortunate enough to capture my first spot on the United States Stunt team. I was happier than Todd Lee at an Adamisin family reunion.

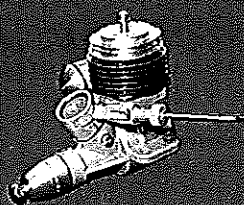
After the contest Jerry and I swapped models for a flight. This confirmed my thoughts about the thinner wing. I didn't like the way his model flew, and he didn't like mine! But I did love the way his airplane looked from the handle. I told him to keep his wing, but I stole his fuselage shape and paint trim! That seemed fair.

Right after the Team Trials I refinished the USA-1 and added the pirated canopy, rudder, and wingtip shapes. The model was finished in late October, so I had some time to fly it and make a few minor trim changes. I was more than ready for the trip to Belgium for the World Championships; I was eager.

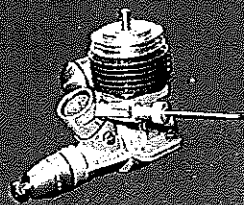
It's funny what goes through your mind while you're waiting for scores to be posted at a World Championships. Bob Gieseke—I hardly even knew him at that time—and I couldn't even look at each other, and there we were; one was about to be crowned the first US F2B World Champion and the other was about to be crowned a miserable American. And that's how it is in world competition. Second place, or Silver Medalist as they say, just doesn't have the ring of "Maquettes Et Vol Circulaire Modeles D' Acrobates Champion."

Bob would get his chance to savor Gold in 1974, and I would taste the bitterness of the Silver then. But on this occasion, the Gold stopped here. I won my first World Championships, and I was delirious.

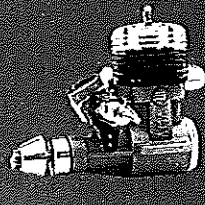
Right after the 1970 World Championships, Doc Jackson, our perennial FAI team manager, informed me that mufflers would be required at future World



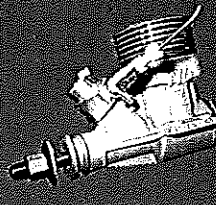
BigMig .049 C/J
Item #NVL514



BigMig .061 C/J
Item #NVL61C



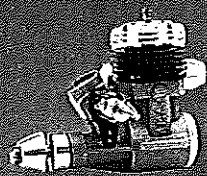
BigMig .074 R/C
Item #NVL67R



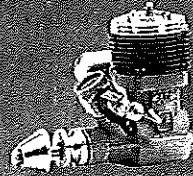
BigMig .15 R/C
Item #NVL15R



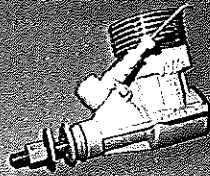
BigMig Start-Up
1500 rpm, 1.5 cubic inch displacement
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Item #NVL500 (061)



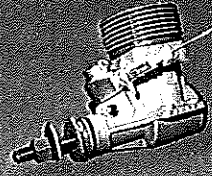
BigMig .049 R/C
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Championships. Great! We finally got the right blend of power and airframe, or at least an acceptable setup, and now we were going to need to find even more power to compensate for the expected losses we'd experience by adding a muffling device.

Enter the SuperTigre .46 (or "Gee, Jerry, they make a .46?"). Not knowing where to start with the .46, I spoke to the few who had any experience with the engine. Out of nowhere, Art Adamisin came up to me at a contest in Michigan and started discussing the .46. He said that the one I really wanted was an older, narrow-bypass version. He generously supplied me with one from his collection with which to work.

This version of the engine, along with the muffler testing I subsequently did, proved to be a better combination than the open-stack .40 I had been running. I thank Art for that critically important information and for the engine.

That was just the beginning of my development of the SuperTigre .46 for Stunt, and that entire story would make for a substantial-sized coffee-table book! I continued to use the Tigre all the way through 1984.

During all of this development I was also trying every likely engine candidate that came onto the market. Although I briefly used other brands and types, the SuperTigre .46, in its many variations, remained the standard bearer for me in the power department. With the SuperTigre .46-powered USA-1 there were a few more successes along the way.

The next couple of years was one of those

rare periods when almost everything goes as you hope and plan it will. Enjoy these times.

In 1971, armed with the new SuperTigre .46 and the muffler, the USA-1 captured both rounds of the finals and gave me my first, long-awaited Open Nats title and my second Walker Trophy. I was one of few at that Nats who used a muffler, and the overall performance of my model, with its new power-train combination, was excellent.

The Team Trials that year was contested on my home field in Cleveland, Ohio. Things went favorably, and I ended up winning the top spot on the team that would head for Finland the following year.

During the winter of 1971-1972, I built the second USA-1. It was basically the same airplane. Why mess with success? This model finished up slightly lighter than the first one. The original USA-1 was relegated to backup and engine-test duties, and there were plenty! I began in earnest to better my stable of SuperTigre .46 engines.

I concentrated on head design, venturi experimentation, cylinder honing, and rechroming. My friend Dave Wallick and I knew most of the people who worked at World Engines—the company that imported the SuperTigre line of engines and parts—and we were able to go there and carefully inspect every SuperTigre .46 piston ring that came into the country. That was certainly to our advantage, and we made full use of the opportunity.

The result of all of this testing was a clear understanding of what this engine needed to produce more consistent power; realize a

much longer life; and have better, more adjustable run characteristics.

I used a Grish 10 x 6 gray nylon three-blade propeller the previous year on the first USA-1. Most of these propellers actually pitched out at 10 x 5. And if you took the time to really look for them, you could find propellers that were much more rigid than normal. These were the ones I used initially and even on the second USA-1 until later in its life.

In 1972 the US Stunt team consisted of the same people: me, Bob Gieseke, and Gerry Phelps. Working together at big meets had brought us closer together, and Bob and I liked and respected Gerry.

Bob and I learned that our competition personalities were similar; neither of us liked to lose! My father had become good friends with Bob during the previous few years, and through him I got to know Bob better. Also, through the years since those teams, Bob and Gerry have come to be close friends as well as fellow competitors.

In Finland Bob started out scoring really well, and I was close behind. In the finals I led from wire to wire. Running out of fuel prematurely on one of his flights, Bob didn't help his chances, and I had captured my second World Championships. The European fliers and judges really seemed to like the clean, large jet look.

However, my luck was about to change. In Finland I used up one of my best-running SuperTigre .46s but won with a good backup engine. When we returned home, we went to the Nats. Somewhere along the line my good

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backup engine had ingested something that scored the piston and ring, resulting in lower performance. I couldn't straighten this out in time and finished somewhere around fifth or sixth.

Al Rabe captured that Nats flying his impressive Hawker Sea Fury. Imagine someone winning a big Stunt meet such as the Nats with a Scale airplane.

In those days I was a traveling musician by trade, and because of scheduling conflicts I was forced to sit out the next two Nats. However, the engine testing and my quests to make the FAI world team continued as strong as ever.

Through all of this, the two USA-1s soldiered on with little to no maintenance or retrimming. These were great airplanes right off the board and through all the years I would use them. And at that point, their story was far from over.

In 1973 I made my third team, flying the second USA-1, and along with Bob Gieseke and team rookie Gene Schaffer, I headed for the 1974 World Championships in Czechoslovakia. There, Bob reversed the results from 1970 and captured his Gold Medal. I wasn't happy with the taste of Silver, but I was happy for my friend.

The last use of the USA-1 for a few years was at the 1975 FAI Team Trials in Dayton, Ohio. The last flight of that meet for me was a do-or-die proposition. When it came my turn to fly, the wind had picked up considerably, and the field was prone to extreme turbulence because of the trees that surrounded it and the fact that it was located in the bottom of a bowl-like depression.

I was sitting in fourth and needed a high-scoring flight to qualify. Les McDonald was occupying the last team spot, having flown outstandingly with his sleek Stiletto 700. The USA-1 cut through the rocky air, as it always had at the turbulent European sites, and when the wind died down I had made my fourth team.

The team for the following year's Championships was set as me, Gene Schaffer, and Bob Gieseke. But in an unselfish act, Bob stepped down to go and fly as the defending champion, allowing a deserving Les McDonald to move onto the team.

Les went on to win the Championships the next year in Holland. At that contest I used my much smaller (Ares-sized) Perroquet, powered by an HP .40, to place a close second (four points!) behind Les.

For the next few years I used other designs for various reasons. There are many different ways to attack the problems presented by this event, and I wanted to try other solutions.

The USA-1 came back into the picture in 1980. This was the third version, but it was distinctly different from the first two. Following the success of Bob Hunt's Genesis in winning the 1978 World Championships, and my favorable impressions of the model and his flying, I decided to try something with a thicker wing such as he was using.

By this time the O.S. .40 FSR had come onto the scene, along with the stroked Superfigre .46/.51, so we had more than enough power to pull a bigger, heavier airplane.

Remember what I wrote about wanting more power, and then when we get it we build bigger models instead of using the extra power in existing designs? Here we are.

I unwittingly began to practice the ancient art of self-deception in talking myself into believing that this was a superior design compared to the original USA-1. And although it did capture third at the 1980 World Championships and the 1980 Nats, in reality it was taking a giant step back into the Bronze Age.

This airplane was difficult to deal with and certainly underscores the first sentence of this article; it whupped me! After the 1980 season I conducted a flyoff between the second USA-1 and the 1980 version. The older USA-1 was the hands-down winner in every aspect, and

that convinced me to give the USA-1 another try.

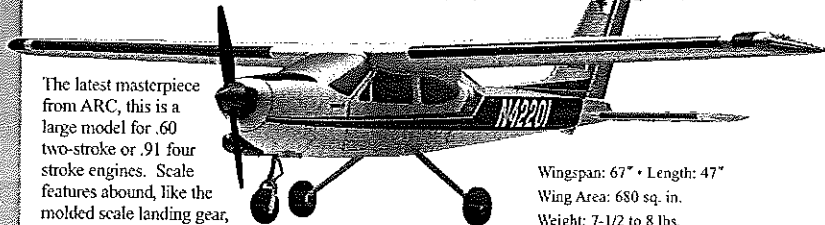
That winter I cleaned up and touched up the second USA-1 and built a new one with the same numbers. In the spring I had a flyoff again, but this time it was between two airplanes that were essentially identical. The new one flew well, but it was slightly heavier. I decided to use the old one for the 1981 Nats and was rewarded with another Nats crown and Walker Trophy win.

I also used that USA-1 later that year to qualify for the 1982 team. I flew it the following year in Sweden and again in 1984 in Chicopee, Massachusetts. Even though I didn't win either of those contests, I decided to retire that great old model that bore the name "USA-1" at the first US-hosted World Championships.



For Today's R/C Enthusiast!

Modelfly Cessna 177 Cardinal



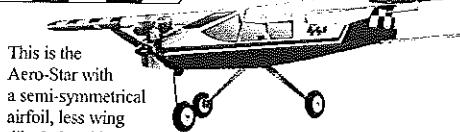
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Occasionally I take the USA-1 out for a day trip away from its retirement home in the attic of my mother's house, and it still reminds me of what a close partner it was through those golden Stunt years. It still flies great and makes me smile.

And who knows? It may have yet another life in the desert at Tucson, Arizona, in the Vintage Stunt Championships. It may also eventually have a new, and as yet unborn, young brother to carry on its Nats and World Championships legacy. I still like the way it looks, Jerry W.

This was not intended to be a normal construction article but rather a history of what I, and many others, consider one of the more influential models of its era. I do not recommend this as a first Stunt model, nor do I think it is a good candidate for your first try at building an I-Beam-wing design.

If you are serious about trying the USA-1, first consider building my Ares or one of the other popular, smaller I-Beam models that have been published. The Ares was presented in the July 2002 *Model Aviation*.

Before attempting any type of I-Beam construction project, I highly recommend getting a copy of the video *How to Build I-Beam Wings* from Robin's View Productions. It will answer in detail all of your questions about the technique.

The USA-1 would make an excellent Classic Stunt design, fitted with one of Aero Products' side-exhaust .40, .51, or .61 Precision Aero engines. It would also be a competitive modern Stunt warrior, fitted with one of the rear-exhaust Precision Aero engines and a carbon-fiber tuned pipe.

The USA-1 wing was so successful in its original form that I used it in several other Stunt models, such as the USA-1P, the Hungarian Bull (don't ask), the Junar series, and eventually the Geo-XL series. For a more detailed explanation of those models, read my Geo-XL article in the April 2001 *Model Aviation*.

Thanks to my buddy Warren Tiahr for drawing and inking this model for me. His work is excellent, and he expended lots of extra time and effort to come to my home to work with me to carefully check the original USA-1 model and plans against his redraw to ensure complete accuracy. Although he may occasionally take off with his flying handle upside-down, he's never been known to draw with his drafting pen upside-down! MA

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Sources:

Precision Aero Engines:
 Aero Products
 1880 Scenic Hwy. N.
 Snellville GA 30078
 (770) 979-2035

I-Beam how-to video:
 Robin's View Productions
 Box 68
 Stockertown PA 18083
 (610) 746-0106