Miles Sparrow Hawk

In the first week of July, 1935, F. G. Miles decided to race for the King's Cup in the following September, even though at that point there was no machine available for him, and with only eight weeks until the race, there was little time to produce a suitable aircraft!. However, in those few weeks Mrs. Miles devised and directed the construction of a racing aircraft which was both fast, manoeuvrable, and pleasing to the eye.

First, a standard Hawk fuselage was taken from the production line and shortened by two feet, then standard Hawk outer wings were fitted direct to the fuselage, without the usual centre-section. Long range fuel tanks and a low, single-strut type undercarriage were next fitted, together with a standard Hawk tail, the job being rounded off with a 140 hp high compression Gipsy Major engine. With a highly polished cream and red finish, the machine was ready on time and was named the Sparrowhawk.

The 1935 Race was flown over two courses, the first, on one day, being a circuit of Britain, while the second day's flying was over seven laps of a triangular course of 50 miles, both events starting and finishing at Hatfield. The first day's racing resolved itself into a thrilling duel between the only designer-pilots in the competition - F. G. Miles and Edgar Percival.

Fifth man to leave Hatfield, Mr. Miles dead-heated for second place at the Glasgow control and had achieved that position outright by the time he reached Belfast, which was the only point at which he had to refuel, thanks to the long-range tanks. At the last control, Cardiff, Mr. Miles touched down as the leader, Mr. Percival, took off on the last stage to Hatfield, but, stopping there only three minutes, he continued the pursuit and caught his rival literally "on the post", thus winning the speed prize, at an average of 163.84 mph for the 953 miles circuit.

In the following day's speed race the Sparrowhawk finished eleventh, at 172.38 mph, but the pilot was quite happy, as his designs had taken the first three places in the Race!

Several Sparrowhawks were built, including two for special high-lift flap research.

Miles Whitney Straight

Aeronautical progress during the 1914-18 war, meant that the aeroplane had graduated from a fair-weather vehicle for the few to an everyday vehicle for the many. With this in mind, in 1924 the Air Ministry held a competition with the object of discovering a light two-seat machine, of low power and economical operation, suitable for the owner-pilot.

The immediate result of this competition was disappointing, because all the entries proved to be underpowered, but the long-term effect was to interest designers in light aeroplane problems and, eventually, to lead to a number of highly successful two-seat private-owner types.

These machines were mainly of the tandem open-cockpit variety, similar in arrangement to the early Hawk monoplanes, and it was not until 1936 that the class neared an ideal in the Miles Whitney Straight side-by-side cabin monoplane. This aeroplane was the result of collaboration between the wealthy aviation enthusiast Mr. Whitney Straight, who then operated a series of flying clubs in various parts of the country, and Mr. Miles, both having almost identical ideas on the form of a modern light aeroplane.

The prototype Whitney Straight (G-AECT) first flown on 14th May 1936 and its all-round good qualities exceeded expectations, comfortable and easy to fly, with a top speed of 145 mph. and a fuel consumption of over 20 miles to the gallon. Immediate production followed the successful flight tests, and 50 M.11A, M.11B and M.11C aircraft were sold in almost every part of the world over the next two years. A number of these were used for experimental purposes, including the testing of various engines and, on the prototype, of auxiliary aerofoil flaps, the data gained proving beneficial to later Miles aircraft. A later model, known as the M.11 C, was fitted with the Gipsy Major Series II engine and a variable pitch airscrew, this combination giving a remarkable take-off and climb performance.

Perhaps one of the finest demonstrations of the all-round handling qualities of the machine was provided by the result of the 1937 King's Cup Air Race, in which General Lewin, then aged sixty-three, flew his own Whitney Straight into second place after a very close contest.

On the outbreak of war, in 1939, most of the Whitney Straights in Britain were requisitioned for R.A.F. communication duties, including 23 for the RAF (21 in the UK and two in India), and three for the Royal New Zealand Air Force. Many were still giving good and faithful service after five arduous years.

An improved model of the M.11 was developed with three-seat accommodation and flown as the M.17 Monarch on 21st February 1938.

Miss Los Angeles

Miss Los Angeles, built by Lawrence Brown for the 1934 Nationals. Painted a scarlet red, she sported a 300hp Menasco engine and turned an impressive 243.14 mph in the Shell Speed Dashes that year. Miss L.A. came in second in the '34 Thompson race at 213.25 mph. As with many planes of the era, Miss L.A. was lost in another tragic crash that killed pilot Lee Williams when she stalled at the first pylon in the Greve race of '39.

Monocoupe 110 Special

Woody Edmondson, airshow pilot and aerobatic champion, thrilled airshow crowds with his Monocoupe 110 Special *Little Butch* throughout the late 1940s. The Monocoupe 110 Special was a special design built for racing and aerobatics from the basic Monocoupe of the 20s and 30s, the airborne sport coupe of the era.

The original Monocoupe design came from Luscombe's desire to build an enclosed two-place aircraft for business or person use, something lighter and more comfortable than open-cockpit biplanes. Luscombe was somewhat influenced by the Belgian Delmonty-Poncelet Limousine, a high-wing monoplane with a side-by-side enclosed cabin and the reverse curve rear fuselage lines that were to become one of the signature identifier features of the Monocoupes. Luscombe founded Central

States Aero Company and hired Clayton Folkerts, a young self-taught designer. In 1928, the Mono 22 was the first light aircraft awarded an Aircraft Type Certificate (number 22) and in 1930 it was fitted with a Velie M-5 engine to become the Model 70. Central States Aero Company became Mono Aircraft, Inc., of Moline, Illinois, a subsidiary of the Velie Motors Company, and the Model 113 and the Model 90 followed.

The Model 110 was basically a Model 90 with a 110 hp Warner Scarab radial engine. The Model 110 Special, a clipped-wing version of the 110, grew out of racing pilot Johnny Livingston's desire to have a faster aircraft for the National Air Races. In 1931 his 110 was streamlined with fairings and wheel pants, and in 1932 Livingston asked Monocoupe to shorten the wingspan from the standard 32 feet to 20 feet, reduce the size and shape of the tail, and install a larger 145 hp Warner Scarab engine. The factory shortened the wingspan to just over 23 feet, retaining sufficient wing area to sustain safe flight during high-speed pylon turns. The changes improved the speed from 150 mph to 220 mph. Over several years, a total of ten Specials emerged, seven were built or modified by the factory, and three were modified by homebuilders.

The Monocoupe 110 Special *Little Butch*, N36Y, was built at the factory in Melbourne, Florida, and test flown on February 3, 1941, by then-Monocoupe president Clare Bunch (Don Luscombe had left the company in 1933). The original base colour of the airplane was Monocoupe Blue with an ivory trim. W. J. Coddington bought the aircraft on March 5, 1941, but severely damaged the airplane in a landing accident and returned it to the factory for repairs and resale. Guy Gully of Farrell, Pennsylvania, bought the aircraft on November 16, 1941, but had an accident and sold it to J. D. Reed of Houston, Texas, on August 3, 1943. Reed sold it on March 16, 1944 to W.W. "Woody" Edmondson of Lynchburg, Virginia, who named it *Little Butch* because of its bulldog-like appearance.

Edmondson initially used the airplane for transportation between airports in Virginia and North Carolina where he operated government-sponsored pilot flight training programs during the war. In 1946 he re-entered the airshow circuit and installed a Warner 185 hp Super Scarab. This engine had a pressure carburettor for inverted flying and had a Koppers Aeromatic controllable pitch propeller. He often flew two or three air shows a day all scheduled close to Lynchburg so that he could fly, in his business suit, from one to another.

One day Edmondson severely tested the structural integrity of the airplane by making a high-speed inverted pass and pulling up into a series of vertical rolls. This manoeuvre always subjected the aircraft to severe negative "g" loading conditions for which the airplane was not originally designed. It went into a series of uncontrollable snap rolls and ended up inverted at about 2,000 feet. Edmondson recovered control but then noticed that the right wing struts had an elbow bend of several inches in them. He reinforced the struts by nesting the next size struts within the existing size streamlined tubing.

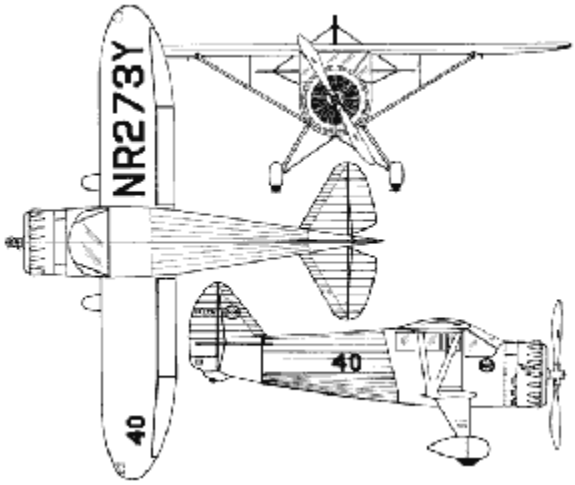
In 1946 and 1947 at the Miami Air Manoeuvres, Edmondson placed second in the aerobatics competition to Bevo Howard in his Bucker Jungmeister, which is also in the NASM collection, but he won in 1948 when the first International Aerobatics Championships were held. Sponsored by Gulf Oil Corporation, he continued to use N36Y on the air-show circuit throughout the east and Midwest until 1951. Edmondson sold the airplane to Johnny Foyle, an air show pilot of South Boston, Virginia, on August 22, 1960, who twice flipped the airplane over on landings. Foyle was killed in another airplane accident and John McCulloch, an Eastern Airlines captain from Naples, Florida, bought N36Y on June 18, 1965.

Wingspan 6.9 m (23 ft)

Length	6.2 m (20 ft 4 in)
Height	1.6 m (6 ft 11 in)
Weight	Empty 448.9 kg (991 lb)

Mr Mulligan air racer

Harold Neumann was talking in his relaxed, friendly Midwestern way about the airplane that amazed the aviation world during one very busy week, back in 1935. During what has since become known as the "Benny Howard National Air Races."



It was really the Cleveland Air Races, but the way Howard and his airplanes won all the big races, it was no wonder he got credit for the whole show.

That "big Monocoupe" was, in actuality, Howard's classic "Mr. Mulligan", a hefty, powerful four-place strut-braced, high-wing machine that didn't Look a whole lot like a 1930's racer . . . unless you were looking at it from dead astern, while trying hopelessly to catch up with it.

"It just seemed that that year was the Benny Howard Neumann year. No matter what we did, we lucked out on it. The year before, that was a bad year," Neumann admitted. And he was right, for 1934 wasn't much of a year for "Mr. Mulligan" or anything else Benny Howard tried. Neumann headed for California and the start of the 1934 Bendix Transcontinental Race, only to be forced down in Nevada and wipe out the landing gear of the brand new airplane. Neumann managed to salvage

fourth place in the Thompson Trophy Race and second place in the Greve Race in Howard's little "Ike", but they had wanted all the marbles.

Mr. Mulligan ready for test flight in 1934 showing early landing gear design. Aircraft has not yet been painted nor race No. 40 applied.

The 1935 Bendix Race was really the beginning. "Mr. Mulligan" was designed very much for such 2,000-mile grinds, having plenty of power and fuel, as well as oxygen for the vital high-altitude flying. Howard, himself, was pilot, with engineer Gordon Israel as co-pilot. After their single re-fueling stop at Kansas City, they sped on to Cleveland in an elapsed time of 8 hours, 33 minutes and 16.3 seconds and an average speed of 238.704 mph. It was the best speed anyone had made in a Bendix Race since Jimmy Haizlip had won it in a Wedell-Williams Racer in 1932. Haizlip wasn't in it this time, but Roscoe Turner was, flying a Wedell-Williams with almost double the horsepower.

Turner had taken off much later than Howard, and so the race would have to be decided on elapsed time. After an interminable wait, Turner sped across the finish line in his gold #57 . . . in the time of 8 hours, 33 minutes and 39.8 seconds! Just 23~/2 seconds later and .2 mph slower than Howard. The great Bendix Trophy went to Benny Howard and to "Mr. Mulligan".

In its first real test, the big white airplane had certainly done its job well, but much more was soon to be demanded of it. The all-time classic event of American air racing was the Thompson Trophy Race, finale of the long National Air Races program. Howard wanted the stately bronze trophy for his own.

Others wanted it, too. Mainly, Roscoe Turner. Edged out in the Bendix, he had no chance for an unprecedented double win, but he had taken the Thompson in 1934 and wanted very much to become the first man to win it twice. Turner had plenty of experience and a fine airplane with more power than any other in the race. Very much the dark horse was Steve Wittman, a veteran of the

lower horsepower classes who was about to enter a completely new airplane of his own design, the Curtiss-powered "Bonzo".

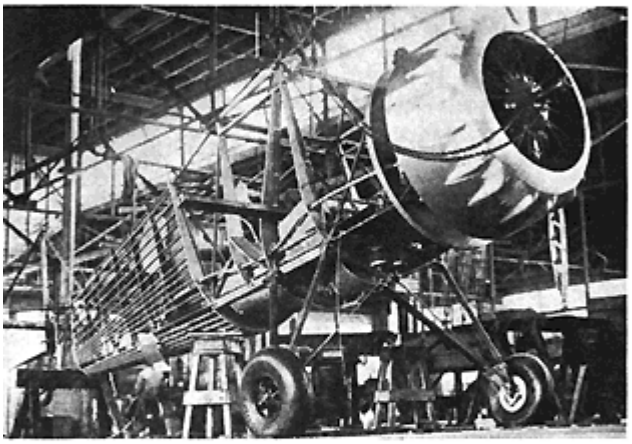
"Mr. Mulligan's" pilot was to be Harold Neumann, and here's how he remembers that big day. "It was a hot day and we got out on the line, engines runnin' and waitin' for the start. Then they kept stalling us. They kept holding us there, on the line. I don't know how long we sat there, but it got very hot in the cabin . . . engine running all the time, head temperatures goin' wild. I would guess we were out there 20 or 30 minutes but it seemed like hours, because we were all keyed up to get goin', and we were just sittin' there.

"Then, when we finally got goin', I had hopes of being the first around the (home) pylon, because "Mulligan" was pretty fast on the getaway. When we got the starting flag, why, I had the brakes set, of course, and was turnin' the engine up pretty high. And when the flag dropped, I released the brakes and shoved up on my throttle and the engine just about quit! It misfired and shook, and I was about to just give up right at that time . . . just pull off the throttle and say, 'Well, that's that!'

"Everybody was on their way and I had started rolling, so I thought, 'well, I'll at least see how much power I can use and then make a decision whether I can take off.' So, I set up the power to where it wasn't shaking so bad, and nursed it off the ground. According to the movies I have, I was the last off the ground, and everybody left me.

"I finally staggered into the air. I was gambling on the (chance) that it was sparkplugs fouled up, because they'd been working on the engine all morning, changing cylinders and whatnot, because I'd burnt out a cylinder that morning, qualifying. It hadn't been test-flown or anything. I figured it was sparkplugs because of sittin' on the ground that long. So, it was a test flight for the first lap or two . . . just to see how well the engine would run and if it would clear out. And it finally did, after a couple of laps, started smoothing out. So I just set a higher power setting and just let'er go, and I started ketchin' up to the slower planes and passing them."

Here are the bare bones of "Mr. Mulligan" during construction at the American Eagle plant.



"Mr. Mulligan" was fabric covered aft of the cockpit . . . note abundance of fairing strips, landing gear construction.

Uncovered, engineless "Mike" shows simpler construction compared to higher powered, heavier, "Mr. Mulligan".

Neumann passed his friend (and, later, fellow TWA captain) Roger Don Rae flying the "San Franciscan", Joe Jacobson in Benny Howard's "Mike", and Marion McKeen in the bright red "Miss Los Angeles". "And I finally got up to Steve Wittman," Neumann continued, "and he was in second place. When I'd pull up alongside of him, why, he'd add enough speed to pull away from me. Well, I just left her alone, 'cause I was happy that I was doin' as well as I was, with that poor start. Finally, Steve let me go by, so I figured he was havin' trouble.

"So, I was in second place. I saw Roscoe (Turner) 'way up there, and I figured there was no use tryin' to catch him. It was getting close to the finish and I was in second place, so I was very happy. I came around the home pylon and I saw Roscoe landing. Of course, I didn't see his pull-out and smoke . . . that he had engine trouble. It flashed through my mind, 'well, is this the end of the race?' I didn't get my signal of the finish, so I kept goin', made another lap and I got the right signal of the finish of the race.

"I came in and landed, and that's when I found out that I'd won the race! Because I wasn't sure about anything, up to that point. It was a poor start and an unknown finish, but that's the way the racing business is."

Against all odds and traditions, Harold Neumann had won the 1935 Thompson Trophy Race in a four-place cabin airplane, against a field of custom-built little racers. Moreover, it was the first-and only-time that one airplane would ever win the two biggest races at Cleveland in the same year. That "Mr. Mulligan" was a most significant racing airplane is beyond serious challenge, but where did it come from . . . and why?

"Mulligan" sort of grew from one thing to another, Harold Neumann reminisced, a few months ago. "The idea, I think, I had a little something to do with it. When I was flying the Howard racers in show work, I had a Lambert (powered) Monocoupe. Benny and his wife, 'Mike' Howard, would fly it occasionally, coming to some of the shows, and he was impressed with that little airplane. One time, he was flying a Tri-motor Ford, with passengers for NAT, from Moline to Kansas City. I had left a little ahead of him and he finally caught me, so we flew along together, side-by-side. I had a little 90-hp Lambert and he had the Ford with the big Wasps, and I think that impressed him.

"Then he had a ride with John Livingston in the clipped-wing 'coupe and he saw the airspeed reading 200 mph with a 145-hp Warner, so that can't help but impress a man like Benny Howard, who loved to build airplanes. So (Eddie Fisher told me this, himself), Benny one day, just says, 'Eddie, how'd you like to draw up some sketches of a big Monocoupe?' Which Eddie did. They started out around the 550hp Wasp Senior, and it was test-flown with that. Then, it was just when they came out with the engine with the big blower on, that put out 750 hp.

"I think, in the back of his mind, he was thinking about building a commercial plane. But he wanted to earn some money, and this was one way of doing it. He was always kidding around with Walter Beech-Beech had the biplane with retractable gear (the classic Staggerwing)-and Benny always told him he could build an airplane that was just as fast, if not faster, with the landing gear out."

When "Mr. Mulligan" appeared on the starting line for the Bendix Race, it was more or less in its element. Most of the other entrants were big cross-country machines: Northrop Gamma, Lockheed Orion, Lockheed Vega. But when it came time for the Thompson Trophy Race around a 15-mile pylon course, it was another matter, for almost all the other airplanes on the line were conventional little racers. How did Neumann feel? Was he out of place, sitting there in a formal cabin airplane?

"You have to go back to . . . what has the man done before? Benny Howard had already proven that he was a successful designer and engineer, and had the know-how. He was always shooting high . . . to do something that nobody else had done, or was afraid to do. Just like when Steve Wittman showed up with his first little midget racer. We just shook our heads; we didn't see how it could do the job, but he proved us wrong.

"So it was with 'Mulligan': It was big, but when you saw that big engine up front . . . Power is what it takes, up to a point, at least. And a clean airplane. The reason 'Mulligan' was as successful as it was, because the round engine worked out well in a large fuselage. That's the reason the Monocoupe was good with a round engine. I have a 145-hp Warner (radial engine) in my plane and I imagine I can get as much speed out of it - maybe even more- than somebody with a flat engine."

Once "Mr. Mulligan" had won both the Bendix and the Thompson, it probably should have been retired, but that's not what champion racing planes are for. It was entered in the 1936 Bendix Race, with Benny Howard as pilot and his wife as co-pilot. A little more than two hours short of the finish at

Los Angeles, "Mulligan" broke its propeller. The crash landing was made on the Colorado Plateau in north-western New Mexico where the Howards were finally pulled out of the wreckage by Indians and taken to a hospital, where they recovered.

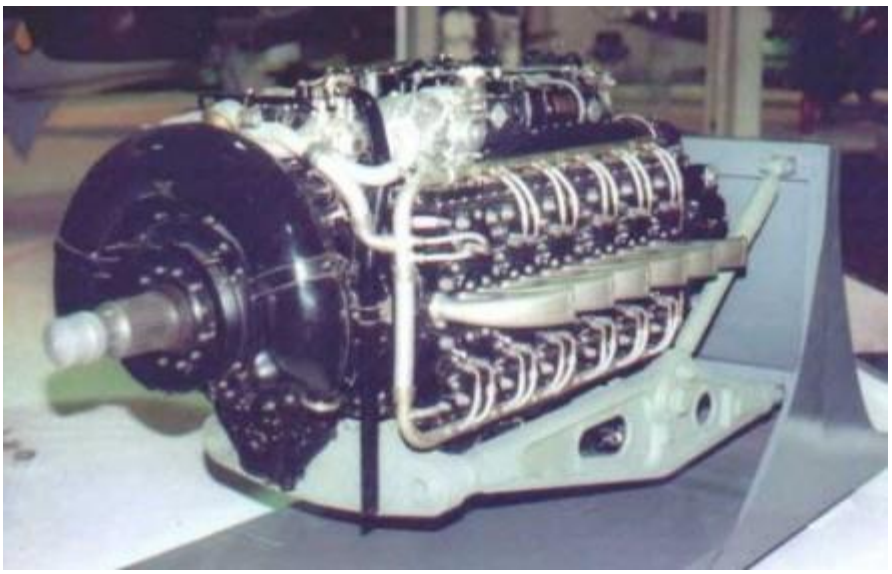
Maxine Howard standing beside "Mr. Mulligan" after roll-out in 1934. She served as co-pilot for Ben in the 1936 Bendix. Over New Mexico "Mr. Mulligan" shed a prop blade and crashed. Amazingly both Maxine and Ben survived the crash, although both were seriously injured.

Much of the remains of the racer were soon removed and its life supposedly ended. But in 1970, a California Howard enthusiast, R. W. Reichardt, embarked on an expedition to the site, eventually locating it with the aid of an old Navajo who remembered seeing the racer crash, 34 years before. A lot of parts were salvaged, having been preserved by the dry, mountain climate, and Reichardt has set out to reconstruct the famous airplane. Its second first flight is expected to take place in late 1974 or early 1975.

Would Harold Neumann, now well into his 60's, be interested in once again flying the airplane which carried him into the history books almost 40 years ago? "Yes, I would! I've flown my 'coupe since I retired from TWA in 1966 and I feel good about it. It took me a little while to get back in the groove, but I think I could take 'Mulligan' or any airplane resembling it and fly it. Anybody who's flown a Howard DGA-15 would be qualified to fly 'Mulligan', if he doesn't get carried away with the idea that it's a hotrod and gets all worked up about it. The airplane was just wonderful, and all you'd have to do is be a pilot, to fly it. **Napier-Heston Racer**

Constructed exclusively for an attempt at setting the World's Landplane and Absolute Speed Record, the Nuffield-Napier-Heston J5 was originally conceived by A.E. Hagg of D Napier and Son in 1936. Financial arrangements for the patriotic venture were offered and provided for by Lord Nuffield (the industrialist, Robert Morris, of MG fame). The order for its general-arrangement and preliminary design work was begun in the spring of 1938 by the Heston Aircraft CO, LTD, Middlesex.

The Heston project design department, headed by Chief designer George Cornwall, was asked to design a super-fast aircraft intended to recapture the world's air speed record, then held by the Germans. The racer's design parameters were to be purposely designed around and powered by a top secret, specially built, blown version of a 24-cylinder, 2,450 HP liquid cooled Napier Sabre engine.



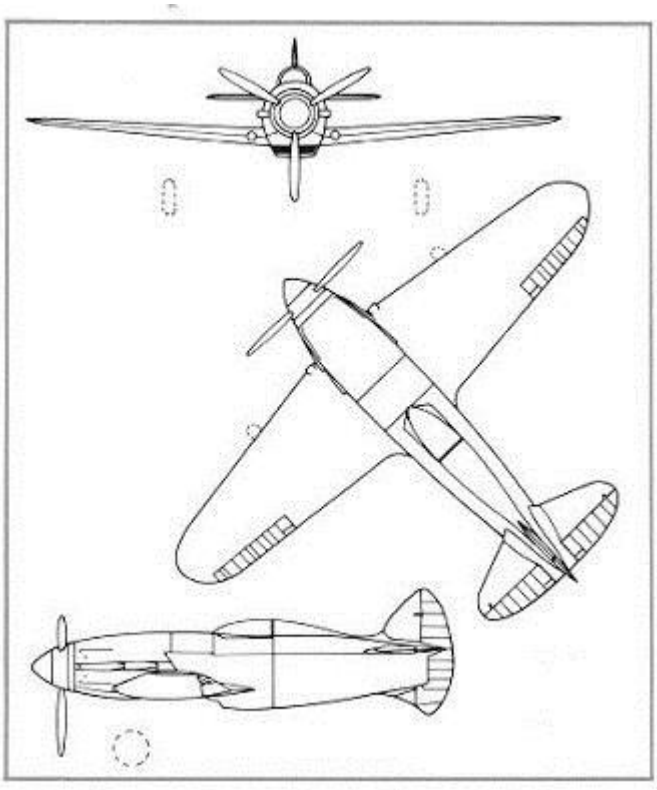
Napier Sabre engine

To ensure rapid construction and achieve a superfine finish, the Napier-Heston Racer was built almost entirely of wood, which in part was attributable to its beautiful lines. The racers weighed in at 7,200 lbs, of which approximately 40% was the dry weight of the specially prepared 2,450 HP Napier Sabre engine. The racer's potential top speed had been reasonably placed at close to 500 mph If it

had not been for the advent of World War II, the Napier Heston racer may have proven itself the fastest piston-powered aircraft of all time.

A rarebird indeed... regarded by many as the most beautiful design achievement in the history of piston-powered flight. Special attention was given by the designers to address the reduction of skin friction, cooling drag and the elimination of parasitic drag caused by a “leaky” engine cowling. The cockpit area was also given attention, besides having a low-pressure outside airflow system and being sealed, a one piece low profile persplex canopy was utilized for its aerodynamic qualities. Within the remarkable high-gloss finish of the aircraft, nearly 20 coats of hand-rubbed Titanine lacquer, could be found many ingenious aerodynamic features that bear mentioning. From the absorption of turbulent air at the mouth of the cooling duct, to the overall finish achieved to reduce parasitic drag through skin friction and other important airflow entries, especially the leading edge of the wings, no scratches more than “half a thousand of an inch” deep were allowed.

One of the innovative aerodynamic design features incorporated by Heston’s design group was the use of a multi-ducted belly scoop. For the first time in the design of aircraft, an attempt was made to control and clear turbulence from beneath the fuselage. The ducted scoop bled off coolant air and yet provided a separate uninterrupted path for boundary layer air to efflux on either side of the rudder, at the rudder post. This new design preceded a similarly designed type belly scoop used on the P-51 Mustangs for many years.



The wing of approximately straight taper form, had airfoil sections of the bi-convex type, symmetrical throughout the greater part of the span, with the maximum ordinate located unusually far back at 40% of the wing chord to delay the onset of shock-stall which was expected at higher speeds. A slight camber was given the tips to avoid tip stall characteristics. The thickness-chord ratio was 16.2% at the fuselage, 12.8% at the landing gear fulcrum, and 9% at the tips. The wing as a whole was aerodynamically “untwisted” and had a span of 32.04 feet, an area of 167.6 sq. ft., with a wing loading of 43.5 lbs. per sq. ft. High, but not considered bad for this type of aircraft. All control surfaces were

mass-balanced and provided with mass-balanced trim tabs, the ailerons were of Frise type, none of the control levers or mass balances projected in the slipstream. As was mentioned before, all critical points, such as the leading edge of the wing, were polished until no surface scratches more than a depth of 0.0005 in. remained.

In December 1938, construction work commenced on two Napier-Heston prototype airframes side by side, in case there were problems with one or the other. The design followed the Air Registration Board's formula for civil aircraft and were allotted the registration numbers, G-AFOK and G-AFOL respectfully, work progressed on each very rapidly. By the time war broke out on September 3, 1939, one aircraft, G-AFOK, was nearing completion while the second airframe, G-AFOL, was approximately 60% completed. The start of war effectively put an end to work on the second airframe, G-AFOL. However, work on G-AFOK was ordered to be completed and the engine was run-up, the first for a Napier Sabre engine in an aircraft, on December 6th, 1939 approximately one year after construction began.

Ground engine testing of the "Racer" prototype began on the 9th of February 1940, with Heston's chief test pilot, Squadron Leader G.L.G. Richmond beginning successful vibration and taxiing tests on the 12 of March, 1940 and continuing them for several months. The "Racer" passed all phases of the ground taxiing tests and prolonged engine run-up, the newly designed aircraft seemed to have no faults.

It was decided to wait for perfect weather. Finally on June 12 1940, Richmond decided to test fly the Heston racer. He taxied out without the canopy. As the aircraft raced across Heston's grass strip at full power, control and response was more than adequate. Then the racer hit a bad irregularity in the grassy surface very hard, causing the Heston to rotate prematurely into a very nose-high attitude. Thirty seconds or so after hitting the bump and full throttle and becoming airborne, the engine coolant temps went critical. Richmond found himself in an unfamiliar flight attitude in a new aircraft that employed a uniquely designed and sensitive flight control system, the landing gear down and no canopy. His first landing in the Heston was going to be hot.

Six minutes after opening the throttle, he had made a wide circuit at about 20 mph, throttled back, and set up for the landing approach. The ignition was not switched off and the DeHaviland-Hamilton constant-speed prop was not feathered. Witnesses say that he leveled out at about 30 ft, stalled, and "banged it" on, quite possibly because he was being scalded from below - there is speculation that an engine coolant pipe or fitting had fractured during the hard bump incident at takeoff. Whether the aircraft stalled or not, it arrived at the field at an excessive rate of descent, hit the ground hard, drove the landing gear through the wings, broke the tail, and ensued other major airframe damage before coming to rest. The pilot was scalded but not badly hurt, the Heston was a complete write-off.

The question since that fateful day has been: Would the purposely built Napier-Heston Racer have been capable of recapturing the world speed record? The racer never had a chance to do so because of the circumstances that occurred. It's design is still regarded by many to have represented the pinnacle in powered flight.

Nemesis

The most successful formula one racer of all time. Now preserved in the EAA museum.

This all composite Sharp DR-90 model was designed and built by Californian Jon Sharp and a 3 member team, Cory Bird, Dan Bond and Steve Ericson. Construction was completed in July 1991 and only minor modifications were accomplished prior to its first racing at Reno in September where it won the Gold Race at 245. 264. It thus became the first plane since the 1947 Goodyear meet to win the national championship in its first race meet ... a notable beginning.

In ten subsequent race meets through 1996, NEMESIS placed 1st in thirty consecutive races, an unprecedented air racing accomplishment, and in doing so, set two national qualifying records and a new national speed record for Formula One racing at 255.257 at Reno in 1993.

In that six year span of race wins, this plane under the hand of the veteran Sharp, won six successive national championships at an average speed 244.68 MPH. This is a consecutive championship record exceeded only by one other Formula One aircraft in the history of the class.

In seeking broader competitive horizons, Sharp and his sleek NEMESIS twice established new world speed records for class C-la (Group 1) aircraft on a 3 KM course ... the first at Oshkosh, Wisconsin in August '93 at 277.26MPH and the second at the same location 3 years later at 283.75.

Northrop Alpha

The Northrop Alpha represents a notable point of transition in modern airline design, for it combined features of the past and of the future in a very utilitarian package. The passengers were enclosed in a comfortable cabin, while the pilot remained exposed—and sensitive—to the elements. The modern aspects of the Alpha—an all-metal structure, semimonocoque fuselage, and cantilever wing—were partially offset by the use of a single engine and fixed gear.

John K. Northrop, who had previously designed the Lockheed Vega, conceived of the Alpha as a means of proving his ideas for quantity production of an all-metal airplane with the machine tools existing in the early 1930s. Always pioneering new ideas and new techniques, Northrop became one of the most influential men in the aviation industry.

The Alpha was designed to be a high-performance plane that could carry mail and passengers out of small fields. The plane was attractive to airlines because of its comparatively high top speed (177 mph for later models) and high reliability. The latter was due in large part to the use of the dependable air-cooled Pratt and Whitney Wasp engine of 420 horsepower.

With the advent of the larger twin-engine Boeing and Douglas transports, the Northrop Alphas were relegated to carrying freight, serving well in this capacity. The Alpha could fly from coast to coast in twenty-three hours, carrying such commodities as freshly cut gardenias, silk worms, medical serums, and auto parts. Stops were made at Winslow (Arizona), Albuquerque, Amarillo, Wichita, Kansas City, St. Louis, Terre Haute, Indianapolis, Columbus, Pittsburgh, Philadelphia, and New York.

Although the Alpha served well, its real importance was its demonstration of Northrop’s multicellular wing and stress skin construction. These concepts were of fundamental importance to the Douglas DC-2 and DC-3.

Transcontinental & Western Air (which was to become TWA) was the launch customer and ordered 5 alphas. Those aircraft began services on April 20, 1931 from San Francisco to New York with 13 intermediate stops. The entire trip took just over 23 hours.

Alpha - Model 2

Capacity: Pilot + 6 passengers
Powerplant: P&W R-1340 Wasp (420 hp)
Length: 28 ft 4-1/2 in Height: 9 ft Wingspan: 41 ft 10 in Wing Area: 295 sq ft Airfoil: Clark Y (18% at Root, 12% at tip)
Gross Weight: 4,500 lb Empty Weight: 2,590 lb Useful Load: 1,910 lb Payload with full fuel and 170 lb pilot: 940 lb Wing Loading: **14.4 lb/sq ft Power Loading:** 10.7 lb/hp
Top Speed: 170 mph Cruising Speed: 145 mph Landing Speed: 60 mph Climb at Sea Level : 1400 fpm Climb at 10,000 ft : 650 fpm **Time, SL to 10,000 ft:** 10.5 min Service Ceiling: 19,300 ft Absolute Ceiling: 21,100 ft Takeoff Ground Roll: 535 ft Landing Ground **Roll:** 475 ft Fuel: 116 gal Oil: 13 gal Years Manufactured: 1930-31 Quantity Manufactured: 12 Certification: ATC 381

Alpha - Model 3

Capacity: Pilot + 2 passengers + Cargo or Pilot + Cargo
Powerplant: P & W R-1340 Wasp C (420 hp)
Length: 28 ft 4-1/2 in Height: 9 ft Wingspan: 41 ft 10 in Wing Area: 295 sq ft Airfoil: Clark Y (18% at Root, 12% at tip)
Gross Weight: 4,500 lb Empty Weight: 2,679 lb Useful Load: 1,821 lb
Top Speed: 170 mph Cruising Speed: 145 mph Landing Speed: 60 mph Climb at Sea Level : 1400 fpm Climb at 10,000 ft : 650 fpm **Climb SL to 10,000 ft:** 10.5 min Service Ceiling: 19,300 ft Absolute Ceiling: 21,100 ft Takeoff Ground Roll: 535 ft Landing Ground **Roll:** 475 ft
Fuel: 116 gal Oil: 13 gal Years Manufactured: 1931 Certification: Group 2-335
Quantity Manufactured: 5 as original equipment. A number of Model 2's were converted to Model 3's by the factory.

Alpha - Model 4

Capacity: Pilot + Cargo
Powerplant: P&W R-1340 Wasp C (420 hp)
Length: 28 ft 4-1/2 in Height: 9 ft Wingspan: 43 ft 10 in Wing Area: 312 sq ft
Gross Weight: 4,700 lb Empty Weight: 2,800 lb Useful Load: 1,900 lb

Top Speed: 177 mph Certification: ATC 451
Quantity Manufactured: None as original equipment. Most Model 3's were converted to the Model 4 configuration.

Alpha - Model 4a

Capacity: Pilot + Cargo
Powerplant: P&W R-1340 Wasp C (420 hp)

Length: 28 ft 4-1/2 in Height: 9 ft Wingspan: 43 ft 10 in Wing Area: 312 sq ft
Gross Weight: 5,100 lb Empty Weight: 2,650 lb (2,660 for NC11Y as equipped) Useful Load: 2,450 lb
Top Speed: 177 mph Certification: ATC 461
Quantity Manufactured: None as original equipment. Most Model 4's were converted to the Model 4a configuration.

Northrop Gamma

On November 23, 1935, explorer Lincoln Ellsworth, with Canadian pilot Herbert Hollick-Kenyon, took off in the Northrop Gamma *Polar Star* from Dundee Island in the Weddell Sea and headed across Antarctica to Little America. This was not the first time that Ellsworth had attempted a trans-Antarctic flight in the *Polar Star.*

Antarctica was the last continent to be discovered and the only one that was mapped entirely from the air. Aerial explorers from the United States, Great Britain, Australia, Norway, Canada, and France can be credited with this feat, and Lincoln Ellsworth was one of the most tenacious of these explorers.

Ellsworth, a World War I pilot, was the son of a Chicago millionaire coal mine owner. He went on his first polar expedition in 1925 with the Norwegian explorer Roald Amundsen. In May 1929, Ellsworth, Amundsen, and Italian dirigible pilot Umberto Nobile made the first transpolar flight in history, from Spitzbergen, Norway, to Alaska, in the airship *Norge.* It was Ellsworth's use of the airplane for exploration, rather than his skills as a pilot, that earned him his place in aviation history.

Ellsworth first took the *Polar Star* to the Antarctic in 1934. Sir Hubert Wilkins, the famous Australian polar explorer, went along as advisor, and the *Polar Star's* pilot was Bernt Balchen. The expedition reached the Bay of Whales by ship on January 6,1934, and Ellsworth intended to make a round-trip flight with Balchen between the Bay of Whales and the Weddell Sea.

However, the 15-foot-thick ice on which the *Polar* Star was standing broke apart and one of the skis slipped through a crack. The aircraft was almost lost, but after long hours of work it was recovered and put back on the ship to be returned to the United States for repairs.

Ellsworth and the expedition went back to Antarctica in September. October and November were considered the best months for flying there, and this time Ellsworth planned to fly from Deception Island to the head of the Weddell Sea. However, before any flight could be made, the *Polar Star* had to be shipped to Magellanes, Chile, for repairs to a broken connecting rod, and by the time the aircraft returned to Deception Island, snow conditions made it impossible to use the runway. The expedition then tried Snow Hill Island on Antarctica's east coast. On January 3, 1935, Ellsworth and Balchen made a successful flight to Graham Land, but clouds and snow forced them to return to Snow Hill Island after several hours.

That November. Ellsworth and Hollick-Kenyon finally succeeded in flying the *Polar Star* across Antarctica. After their takeoff on the 23rd, they flew at an altitude of 13,400 feet; on crossing the 12,000-foot peaks of the Eternity Range, they became the first men to visit western Antarctica. Ellsworth named a portion of that area James W. Ellsworth Land in honour of his father.

The *Polar Star* made four landings during its flight across the Antarctic. After a blizzard that occurred during the night at the third camp, the inside of the plane was packed solid with drifted snow. The two explorers spent a whole day scooping out the dry, powdery snow with a teacup.

On December 5, fuel exhaustion forced them down about 25 miles short of their goal of Little America. They walked for six days to reach there, and then settled down in the camp abandoned by Richard E. Byrd several years earlier.

The British Research Society ship *Discovery II* sighted them on January 15, 1936. Hollick-Kenyon later returned to recover the *Polar Star.* The total distance flown by the *Polar Star* before its forced landing was about 2,400 miles. The U.S. Congress voted Ellsworth a special gold medal for his Antarctic exploration and "for claiming on behalf of the United States approximately 350,000 square miles of land in the Antarctic representing the last unclaimed territory in the world."

The *Polar Star* was one of two Northrop Gammas that were the first aircraft produced in 1933 by the newly established Northrop Corporation of Inglewood, California. The Gamma is a low-wing, all-metal cantilever monoplane with a 710-hp 9-cylinder Pratt & Whitney Hornet engine. The one built for Ellsworth had two seats in tandem with dual controls. The other of these first two Gammas was built for Frank Hawks, who at the time was a pilot for Texaco. Hawks's Gamma was a single seat model. On June 2,1933, Hawks set a west east non-stop record in his Gamma, flying from Los Angeles to Floyd Bennett Field, New York, in 13 hours, 26 minutes, 15 seconds.

In April 1936, Lincoln Ellsworth donated the *Polar Star* to the Smithsonian.

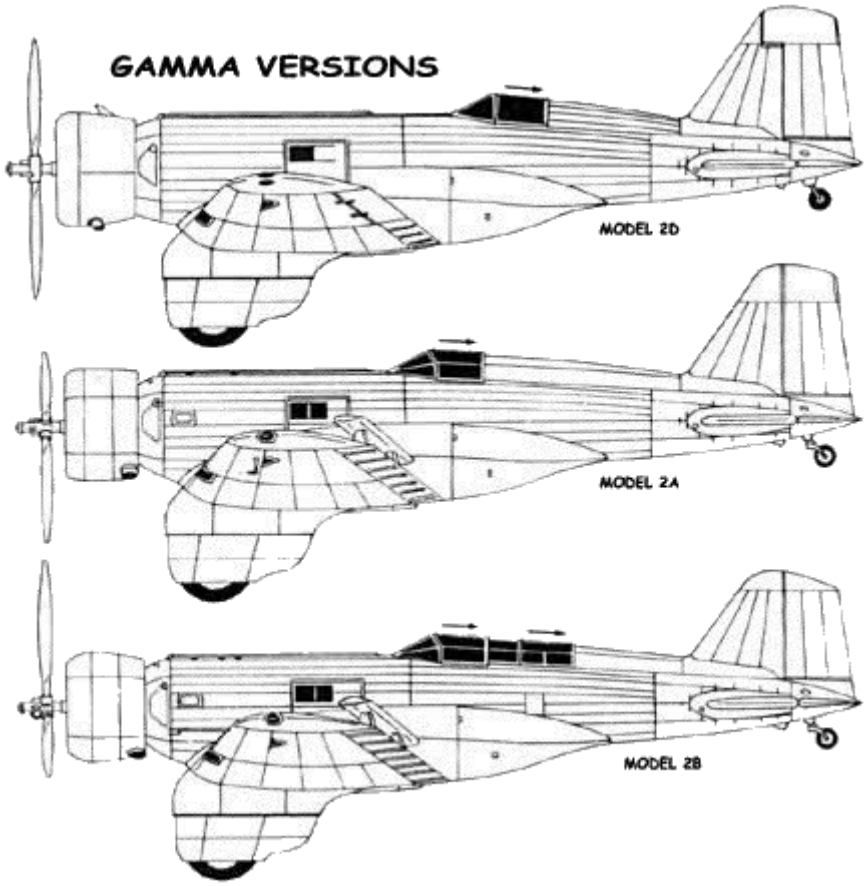
With its long-range speed capabilities so readily apparent, it was not surprising that such speed enthusiasts as Jackie Cochran wanted the Gamma. Hers was something different, being powered by a 700 hp Curtiss Conqueror liquid-cooled V-12 tucked into a slim cowl. It was her plan to fly it in the

MacRobertson Race from England to Australia in 1934, but the airplane was badly damaged on its delivery flight. The Model 2G was rebuilt with a Pratt & Whitney Twin Wasp in the nose. Jackie started the 1935 Bendix Race in it but dropped out early because of severe weather.

Howard Hughes then took over Cochran's NR-13761 and proceeded to blast speed records in all directions: Los Angeles to New York in January, 1936, at 255 mph; Miami to New York in April, 1936, at 250 mph; Chicago to Los Angeles in May, 1936, at 215 mph.

The one and only Gamma Model 2B was delivered to Lincoln Ellsworth who named it 'the Polar Star.' Ellsworth took the airplane to Antarctica aboard a ship in 1934 with the famous aviator Bernt Balchen as his pilot. Ellsworth had planned a round trip flight between the Bay of Whales and the Weddell Sea. While still preparing for the flight the ice beneath the polar star broke apart and it was nearly lost. After considerable effort the plane was recovered and loaded back aboard a ship and then subsequently returned to America for repairs. Ellsworth and the Polar Star returned to Antarctica in September, however before a flight could be made the plane broke a connecting rod and had to be shipped off once again for repairs.

Finally, after returning once again to Antarctica and finding an adequate runway the plane flew over Antarctica on January 3, 1935. The following November Ellsworth and Canadian pilot Herbert Hollick-Kenyon succeeded in flying the Polar Star across Antarctica, becoming the first men to visit western Antarctica. The Polar Star made a number of landings on it's journey across Antarctica before it was forced down by fuel starvation just 25 miles short of it's transatlantic goal. Over 2400 miles had been flown before the aircraft was forced down. The crew abandoned the aircraft and walked the remaining 25 miles to their destination, taking 6 days to arrive. The aircraft was later recovered and donated to the Smithsonian where it is currently on display.



The Gamma family consisted of a number of variants. The Gamma family was an outgrowth of the Alpha, initially serving as a rugged civilian transport the Gamma eventually found it's way into military service with the US, Spain, China as war approached.

Model 2A, Qty 1: First Gamma delivered (1932). Purchased by Texaco on February 14, 1933 for $40,000. Frank Hawks, the director of the Aviation department for the Texas Company used it for a number of record breaking flights. This aircraft was officially named "Texaco 11" and commonly referred to as "Sky Chief". It was in this single seat model gamma that Hawks set a west to east non-stop record flying from Los Angeles to New York, in 13 hours, 26 minutes, 15 seconds (2 June 1933.)

THERE ARE MILITARY airplanes, and commercial airplanes, and scientific airplanes, and sport airplanes. And there is at least one airplane which earned its place in the sun by being all these things and by looking so great that it could easily have attracted the world's attention by just sitting on the ramp motionless. The Northrop Gamma was that plane.

"Polar Star"
Wingspan 14.6 m (48 ft.)
Wing Area 363 sq. ft.
Length 9 m (29 ft. 9 in.)
Height 2.7 m (9 ft.)
Weight 1,589 kg (3,500 lb.)
Normal Loaded Weight 7000 lbs

It began as a speed pilot's dream come true; eventually it led to an Army bomber and to fast, comfortable, high altitude passenger travel. Along the way, it pioneered flight in the Antarctic and set a fistful of transcontinental speed records. To do all this, it had to combine what were then the latest technical ideas with such radical concepts as wind-tunnel designed wing fillets and large split flaps.

The beginning was February, 1932, when Frank Hawks decided his TravelAir Mystery Texaco 13 wasn't fast enough and asked the manufacturers to come up with something better. It was to be financed by his employers, Texaco. Famed designer John K. Northrop played the major role in planning, and it was his brainchild that the Northrop subsidiary of Douglas set to work on. Designing began in May, 1932, and the first Gamma, named Sky Chief, was test flown on Dec. 3, 1932.

It was long and it was sleek and it was metal from cowl to tail cone. The elaborate wing-fuselage fillets eliminated all the troublesome interference problems encountered by other low-wing airplanes and actually reduced the total drag. It was possible to place the wing completely under the fuselage, which allowed for much greater space inside. Older planes had been forced to clutter up their cargo space with bulky wing spars, but now there was plenty of room for freight or passengers on planes like the Gamma or, later, the DC-3.

But what really counted was how quickly you could get from where you were to where you wanted to be. Frank Hawks showed how fast his big silver bird could do its job by flying from Los Angeles to New York (no simple trick in those days) at an average speed of 180 mph for the 2450 miles. Power for NR-12265 was a 14-cylinder Wright R-1510 Whirlwind, rated at 700 hp at sea level. The fame achieved in this and other speed runs was just what Texaco wanted, being worth far more than the plane's original purchase price of only $40,000.

The Sky Chief was flown by Hawks for more than a year, then sold to boat builder/racer Gar Wood in 1934. An accident during the 1936 Bendix Trophy Race from New York to Los Angeles finally destroyed the ship when it exploded in flight and sent pilot Joe Jacobson home in a parachute.

By any standards, the Gamma was a success, so nothing could be more logical than to build more. The second Gamma (Model 2B) went to Arctic explorer Lincoln Ellsworth in 1934. He and pilot Bert Balchen tried flying it to uncharted regions of the Antarctic that year. However , the plane was damaged when it became stuck in the ice and had to be returned home. Finally, on Nov. 23, 1935, Ellsworth and Canadian pilot Herbert Hollick-Kenyon took off from an island in the Weddell Sea and headed for Admiral Byrd's pioneering base at Little America. This modified Gamma Model 2E was the prototype of the bomber version supplied in quantity to the Chinese to use against the invading Japanese in the years just before World War II

Yet another Gamma got into the racing game: NC-2111 owned by publisher and physical culture faddist Bernard McFadden. Carrying the owner's name in huge letters along the side, it was flown to third place in the 1935 Bendix Trophy Race at 202 mph by Russell Thaw.

The largest number of Gammas built were Model 2Es, 51 of them came off the assembly lines. For the most part, they were military versions, destined for the Chinese Air Force which, in the mid1930's, already was fighting what would become the Pacific half of World War II. Armed with just three .30 cal. machine guns and carrying about 1000 lbs. of bombs, they probably were at quite a disadvantage against the fast, manoeuvrable little Japanese fighter planes.

Other Gammas-mainly 2Es went to a number of countries for a variety of reasons. One that got as far as Sweden was SE-ADW Smaland, used by a predecessor of today's Scandinavian Airlines System in night airmail flying until aileron flutter proved its undoing. At least two found their way to Great Britain, one being a Model 2E used for experimental purposes by the Air Ministry, and the sole Model 2L used by Bristol as a flying test bed for its Hercules sleeve-valve engine.

Only one complete Gamma is known to be in existence: the ski-equipped Polar Star, which is on display in the Smithsonian. It is in excellent condition, except for some dents and scratches acquired many years ago when it was slithering around the ice.

P51 Mustang

The P-51 Mustang evolved from a British contract in 1940 for a fighter airplane that could go faster than any other current American fighter. Designated the NA-73X project, the Mustang was designed in just 117 days. The first Mustangs were delivered to Britain in November, 1941. Initially equipped with an Allison engine, the performance of the Mustang was found inadequate. A few Mustangs that were being used for engine experiments were provided with the Rolls-Royce Merlin engine and the increase in performance caused North American to redesign the airplane. The Merlin equipped Mustangs were to become the best fighter of the Second World War, serving both in Europe and the Pacific.

With emergence of jet fighters at the end of World War II, the Mustang, as well as every other piston engine fighter, were rapidly becoming obsolete as warplanes. As a result, thousands of Mustangs were scrapped or sold for a fraction of what they were worth. Air race pilots took advantage of this, and quickly bought P-51's and modified them to compete in the closed course Thompson Trophy Race.

A P-51K Mustang was flown by Robert Swanson in the 1946 Thomson Trophy Race. Swanson's first Mustang for the 1946 National Air Races was damaged when it crash landed during a Thompson Trophy qualifying lap. With only several days before the race, Swanson found another Mustang and named it "Second Fiddle". Although "Second Fiddle" only took a fifth place in the Thompson Trophy Race, it did turn in the fastest single lap speed of 378.4 miles per hour.

Type:	P-51K single-seat land based fighter
Powerplant:	One 1,680 hp Packard Merlin V-1650-7 piston engine
Performance:	Maximum speed 442 mph at 24,500

	feet; climb 10 minutes to 20,000 feet; range (normal) 950 miles
Weights:	7,000 lb.; 9,200 lb. gross
Dimensions:	Span 37 ft.; length 32 ft. 3 in.; height 8 ft. 8 in.

Mustangs, some highly modified are still the mainstay of the unlimited class at the Reno races.

Dago Red...the most successful P51 modern racer

Percival P34 Proctor

The Percival Proctor was a development of the pre-war Gull. The prototype D.1 Gull (G-ABUR) , a three seat tourer first appeared in 1932. This was followed by the D.2 which was more commonly known as the Gull IV. In 1934 Percival introduced the D.3 Gull Six which featured the DH Gipsy Six

engine, improved undercarriage and cabin arrangements, but retained the Gull IV folding wing. In November 1935 the four seat K.1 Vega Gull was introduced. Powered by the same DH Gipsy Six engine this introduced dual controls and flaps, and was very successful with 90 being produced up till July 1939.

It was in a Gull, G-ADPR that New Zealand Aviatrix Jean Batten set many of her records.

The Proctor was initially a military variant of the Vega Gull with seating reduced to three. It was primarily used for training and communication work by the RAF, FAA, and Air Transport Auxiliary. The Proctor I was a communications model, and the naval version carried a radio operator in the rear. The Proctor II was used by the FAA with the radio operator alongside the pilot. The Proctor III series one was used by the RAF as a three seat communications aircraft , and the series two as a two seat radio trainer. The Proctor IV was a substantial redesign returning to a four seater, involving a longer deeper cabin (and was initially to be renamed the Precepter). The aircraft was utilised as a three seat radio trainer, or four seat communications aircraft. The Proctor V is a civil version of the Proctor IV. Production amounted to 247 Mk.I, 175 Mk.II, 437 Mk.III, 258 MK.IV, and 150 Mk.V. A single Proctor 6 floatplane was produced in 1946 for the Hudson Bay Company.

Post war several hundred military Proctors were released for civilian purchase, including FAA aircraft P6034 (later became G-AHDK/OO-AVG) and Z7251 (became G-AIRF), and along with the Proctor V were a popular aircraft up until the 1960's. Several aircraft were then lost to the failure of glue joints. As a primarily wooden aircraft utilising casein glues, the costs of maintaining the certificates of airworthiness meant that from that time any aircraft were withdrawn from use.

Sizes and weights		
Total Length :	28.182 ft	8.590 m
Greatest height :	7.251 ft	2.210 m
Wingspan :	39.501 ft	12.040 m
Wing area :	202.040 sqft	18.770 qm
Max take off weight :	3501.5 lbs	1588.0 kg
Weight empty :	2370.4 lbs	1075.0 kg
Performance data		
Max. speed :	139 kts	257 km/h
Cruising speed :	121 kts	225 km/h
Service ceiling :	13993 ft	4265 m
Wing load :	17.43 lbs/ft2	85.00 kg/qm
Range :	435 nm	805 km
Propulsion		
Kind :	KRei	
Type :	De Havilland Gipsy Queen II	
Power rating (max.) :	207 hp	210 ps
Count :	1	1
Total power rating (max.) :	207 hp	210 ps
Other		
Crew :	0	0
	9pt	

Shoestring K 10 Polecat

First place winner and world speed record holder at the 1980 Cleveland National Air Show Formula One race. The "Polecat" is a Formula One racing airplane built in 1970 by Vince DeLuca of Mira Leste, California. It is a copy of an earlier highly successful racing aircraft called "Shoestring", which initially flew in the 1949 Cleveland National Air Races.

The "Polecat" is part of a group of airplanes that were officially called the 190 Cubic Inch Class - indicating the maximum size engine permitted. These tiny and relatively inexpensive airplanes were first introduced at the 1947 Cleveland National Air Races. They immediately became popular with pilots and spectators alike.

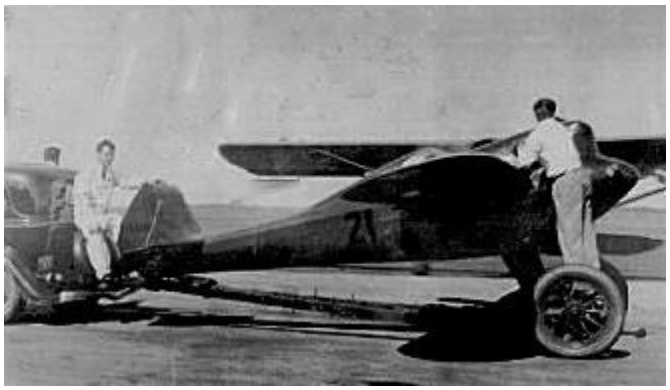
When this aircraft was built it was given the race number 93 and originally called "Rickey Rat". It campaigned successfully for several racing seasons and was then sold to John Parker in California, who renamed the plane "Top Turkey". In 1980 it was purchased by Jack Venaleck of Madison, Ohio. For the 1980 racing season the craft was renamed the "Polecat".

The "Polecat" is unrestored and appears exactly as it did in the 1980 Cleveland race. 22

It was acquired by the Crawford Auto-Aviation Collections and Display Committee and the Friends of the Frederick C. Crawford Auto-Aviation Museum.

Type:	Shoestring K-10 Single Seat Pylon Racer
Powerplant:	150 hp Continental 0-200-12
Performance:	Maximum speed Approx. 250 mph
Weights:	525 lb. empty; 800 lb. gross
Dimensions:	Span 18 ft. 9 in.; Length 17 ft. 9 in.

Speed King 1



The diminutive Speed King 1 in a photo taken in 1930. This airplane was built for the Cirrus derby in 1930 and raced nearly every year till 1937 she did 142 mph in 1930 and by 1935 she had the best speed at the races, making 187.65 mph, flown by Harold Neumann

Seversky Sev S-2

Russian immigrant Alexander F. de Seversky had built a very successful aircraft company. During the 1930s, the one-legged former Czarist Russian aristocrat had a very profound effect on American military aircraft design but he also wanted to showcase his aircraft at the popular National Air Races. After winning the highly prized Air Corps competition with his design that would become the P-35, Seversky came up with the clever idea of sending "near" P-35s to the races and he was not short of buyers.

Frank Fuller had benefited from the fortune accumulated by the Fuller Paint Company and he wanted to go racing. Accordingly, Seversky came up with the SEV-S2 (later, just S-2) which was a very thinly civilianized "sports" model of the P-35. Finished in highly-polished metal and given the restricted civilian registration of NR70Y, the SEV-52 was hurriedly built so that Fuller could compete in the 1937 racing season. Since this was an "out of the box" aircraft, testing was fairly minimal. Minus military equipment, the racer was lighter than the P-35 while a slightly lower canopy had been installed to reduce drag.

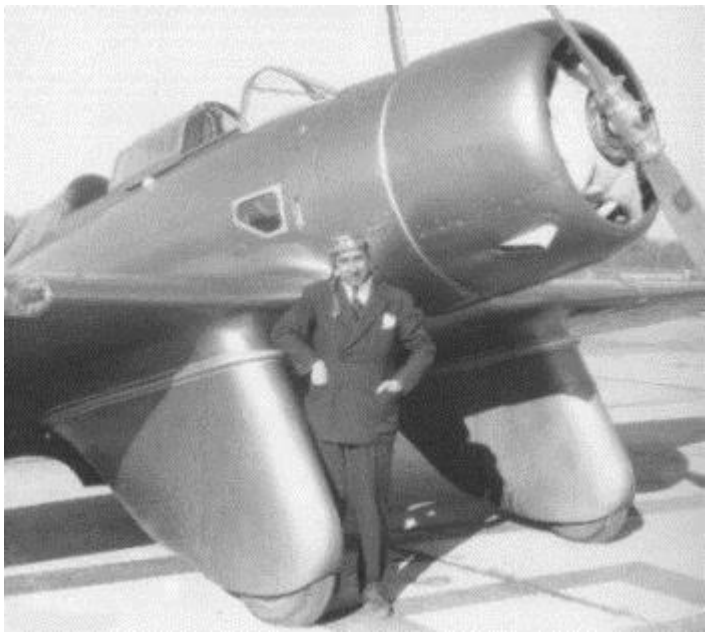
Fuller and the Seversky were on hand at Burbank for the start of the cross-country Bcndix event on 3 September 1937. Taking an immediate lead, Fuller had a refuelling stop at Kansas City and then headed for Cleveland - diving across the finish line to win with a record Bendix speed of 258.2-mph. However, he did not land but pressed on to Floyd Bennett Field to break Roscoe Turner's 1934 speed record and set a Bendix time record of 9-hr 35-min. The win was a decisive demonstration of what money could buy. Interestingly, NR70Y was not the only Seversky in the race - Frank Sinclair, a Seversky test pilot, flew SEV4XP R18Y (which had served as the prototype for the P-35) to fourth place at 184.92-mph. Fuller handed the Thompson flying duties over to Ray Moore who placed a disappointing sixth at 238.411-mph in the 20 lap, 200-mi event.

For 1938, Fuller was back and intent on once again winning the Benclix, There had been protests from the "homebuilt" racer contingent and the race committee came up with a new rule that stated an aircraft raced in the Bendix could not be raced in the Thompson. This pretty much left the Bendix for factory production aircraft and the Thompson for the scratch-built racers. The P&W Twin Wasp in the Seversky had been tipped to 1200-hp from 1000-hp but Fuller had competition for the 2043-mi race in the form of Jacqueline Cochran who was also flying a Seversky - SEV-AP-7 NX1384. Try as he might, Fuller and Race 77 (changed from the previous Race 23) finished second at 238.6-mph while Cochran, who went high and flew between 16,000- and 22,000-ft, took first at an impressive 249.8-mph.

Ruminating on his second place finish, Fuller finely groomed the Seversky for 1939 - including a beautiful new metallic blue paint scheme (Fuller Paint, of course!). The racers took off from Burbank early on the morning of 2 September and Fuller climbed through the marine layer and went high with the throttle all the way forward - it paid off and he flashed across the finish line in Cleveland at 282.1-mph, nearly 40-mph faster than Jackie's 1938 winning speed. He then continued on to Bendix, New Jersey, to set a Burbank-to-Bendix record of 273.1-mph. This was, of course, the last year for the classic Cleveland event. War had been declared in Europe and the global situation was dramatically changing.

Seversky was in plenty of trouble at his Long Island factory. With a great deal of secrecy, Seversky had sold 20 SEV-2PA-B3 two-place fighters to Japan in 1939. When discovered, the contract and Seversky's role became extremely unpopular with the military and public alike. Seversky was booted from the controlling position of his company which was then reorganized as the Republic Aviation Corporation.

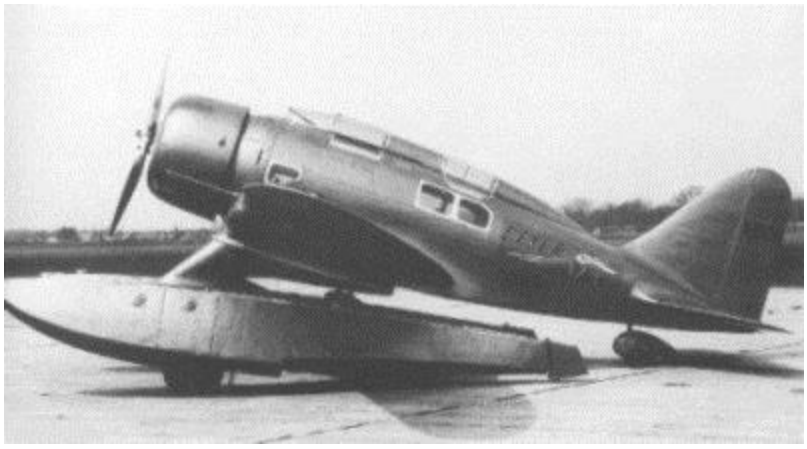
Seversky SEV S-3



The record breaking SEV-3 amphibian as it appeared at Wright Field in the summer of 1934.

The first design was manufactured under contract by Edo Aircraft Corporation of College Point, Long Island, NY. Designed as a low wing monoplane design, this first aircraft, designated the SEV-3, was a floatplane. Edo, being the leading manufacturer of aircraft floats, was an ideal choice when one considers that Seversky had no manufacturing facilities. Even with Edo's expertise, construction still took two years, largely due to the lack of capital funds.

Finally, in June of 1933, the SEV-3 took off from Long Island waters with Seversky at its controls. Painted in a stunning bronze, the SEV-3 was one of the more advanced aircraft in the world. Several months later and fitted with a more powerful engine, the SEV-3 set a new world speed record for amphibians. One major contributor to the plane's excellent speed was its distinctive thin, but broad semi-elliptical wing. This basic wing design would still be seen on the P-47 a decade later.



Major Alexander de Seversky at the controls of the prototype BT-8 (developed from the SEV-3XAR

Short Crusader

Design Company:	Short Brothers (Rochester & Bedford) Ltd
First Flight:	4 May 1927
Crusader:	1 - Short, Rochester

Type Specification

Applies to:	Short Crusader
Type:	Racing seaplane
Wing:	Low wing monoplane. Wings of nearly elliptical plan with maximum chord and thickness at half span with bracing wires to fuselage and floats. Wings of wooden construction
Fuselage:	Fuselage of circular section is of wooden construction aft of cockpit and metal construction forward
Tail Unit:	Cantilever monoplane tail attached to fuselage with single fin and rudder
Landing Gear:	Twin single step floats of metal construction

Power Plant:	One 808 hp Bristol Mercury I 9 cylinder, single row, air cooled radial engine in nose
Accommodation:	Single seat for pilot in open cockpit at wing trailing edge
Dimensions	
Span:	26 ft 6 in
Length:	25 ft
Height:	Unknown
Wing Area:	120 sq ft
Weights	
Empty:	1,938 lb
All-up:	2,712 lb
Performance	
Max Speed:	270 mph

Sopwith Tabloid

Sopwith Tabloid Seaplane, Schneider Trophy, 1914

The Sopwith Tabloid was constructed in 1913 as two-seater racing aeroplane. The design was one of extreme simplicity. The engine was the popular 80 h.p. Gnome rotary enclosed in a peculiar metal cowling, with two small cooling slots in front. The fuselage, a wire-braced woods box girder, was rather broad, for the pilot and passenger sat side by side in the one cockpit. The wings were of usual fabric-covered wooden construction, with raked tips. Wing warping was used for lateral control. The undercarriage was equipped with twin skids.

Flown by Harry Hawker, the Tabloid performed excellently on test at Farnborough. reaching a speed of 92 m.p.h and climbing to 1,200 feet in one minute, with pilot. passenger and fuel for two and a half hours' flying. Its first public appearance at Hendon was sensational; it easily outclassed the monoplane, which had hitherto been supreme.

The original machine was taken by Hawker to Australia- he returned in June 1914; by then the aeroplane had a plain vee undercarriage and the fabric had been removed from the rear end of the fuselage.

On April 20th, 1914, Howard Pixton, who had take over Hawker's duties, piloted a seaplane version of the Tabloid to victory in the Schneider Trophy race. This model had the 100 h.p. Gnome Monosoupape engine and plain rudder and fin.

Production commenced in the spring of 1914 for both the R.F.C. and R.N.A.S. The service machines were single seaters, had rudders and fins resembling those of the Schneider seaplane, and twin-skid undercarriages. A few had extra bracing struts to each skid.

Sopwith Tabloid Seaplane, Schneider Trophy, 1914 Pilot C. Howard Pixton is on the port float

Four Tabloids went to France shortly after the outbreak of war, and were eventually attached to squadrons for fast scouting duties. An early success was obtained by Lieutenant Norman Spratt, who forced down a German machine by circling his Tabloid around it; his only 'armament' at the time being a bundle of steel darts! Some R.N.A.S. machines had Lewis guns fitted on their top wings to fire above the revolving airscrew. One naval Tabloid had a Lewis gun fixed on the starboard side of its fuselage to fire through the airscrew arc; deflector plates protected the blades from damage-a device invented by the French engineer Saulnier and used on the single-seater Morane Saulnier monoplane.

The type scored its greatest success in the light bomber role. On October 8th, 1914, the first two R.N.A.S. Tabloid' to reach the front, Nos, 167 and 168, took off from beleaguered Antwerp to raid the Zeppelin sheds at Cologec and Dusseldorf. Squadron Commander Spenser Grey, flying 167, was unable to find his target, and bombed the railway station at Cologne, flight Lieutenant Marix dropped his 20 lb. bombs on the airship shed at Dusseldorf and destroyed the new Zeppelin Z.IX. Both aeroplanes were forced to land, but the pilots reached Antwerp before the town was evacuated by the Allies.

Later machines had ailerons for lateral control, In place of wing warping. It is believed that about forty of the type were built.

A specially modified Sopwith Tablid was the winner of the Schneider Trophy race, in 1914. alterations consisted of the addition of two floats and a more powerful engine. On April 20, 1914. at Monaco, Howard Pixton flew an average of 86.9 mph (39.6 kph). In two extra laps, he reached 92 mph (148 kph). establishing a new seaplane speed record. Thus the Sopwith biplane had its revenge on the Deperdussin monoplane and gave Great Britain its first major international success in aviation.

The special version of this plane prepared for Britain's first appearance at the Schneider Trophy was not substantially different from the model that had appeared the previous autumn. The land version of

the Tabloid was designed by T. O. M. Sopwith and F. Sigrist. as a demonstration and racing aircraft. It was built in great secrecy, and preliminary tests were made at Brooklands in autumn 1913. These were followed by the official evaluation tests, and the plane immediately demonstrated its speed and manoeuvrability.

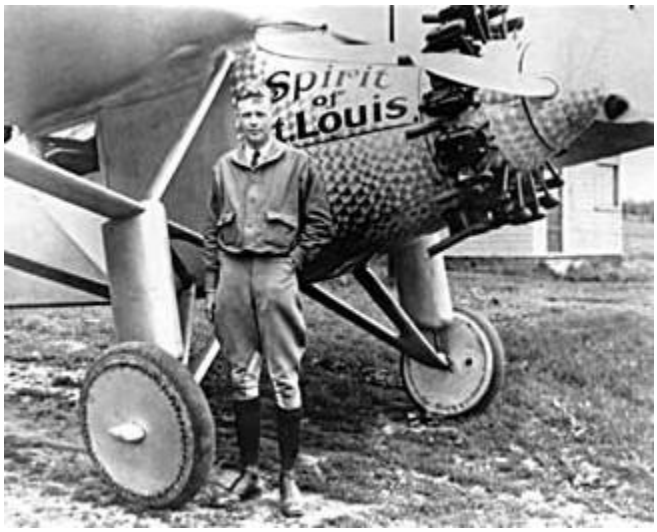
At the Royal Aircraft Factory at Farnborough, where the tests were conducted, the Tabloid reached a top speed of 92 mph (148 kph) in horizontal flight and showed a rate of climb in the order of 1,200 feet per minute (365.75 metres per minute). The same day, November 29, test pilot Harry Hawker flew the plane to Hendon, where one of the popular Saturday air meetings was being held. The new Sopwith was seen by more than 50,000 spectators, and flew two low-altitude laps round the course at more than 87 mph (140 kph). After that, the plane was ordered in large numbers by the army and the navy as a single-seater reconnaissance aircraft.

Sopwith Tabloid Seaplane, Schneider Trophy, 1914

Then the Sopwith company readied one of its single-seaters for the upcoming Schneider Trophy race. Since the race was restricted to seaplanes, the aircraft had to be modified. The landing gear was removed, and a large central float was installed in its place. The 100-hp Gnome engine was also modified for the occasion. The single float did not stand up to tests, the plane capsizing. There was very little time left before the race, so the Sopwith designers decided to slice the original float in half to make two new ones. This time flight and landing tests on the Thames were successful, and the Tabloid was sent off to Monaco on April 8, 1914. The final modification before the race was the installation of a better propeller. The rest is history.

Back in England after the race, the floats were removed at Sopwith's factory at Kingston-on-Thames, and a V strut landing gear was installed. Now the plane was ready for R. H. Barnwell to fly at the 1914 Aerial Derby. But because of poor visibility the plane did not complete the race. That was the end of the Tabloid's racing career. War broke out, and the Tabloid served as a reconnaissance plane during the first months of the conflict, when its speed and general handiness became very useful military assets indeed

Ryan NYP Spirit of Saint Louis



Charles Lindbergh and the "Spirit of Saint Louis"

The "Spirit of St. Louis" was designed by Donald Hall under the direct supervision of Charles Lindbergh.

It is a highly modified version of a conventional Ryan M-2 strut-braced monoplane, powered by a reliable Wright J-5C engine. Because the fuel tanks were located ahead of the cockpit for safety in case of an accident, Lindbergh could not see directly ahead, except by using a periscope on the left side or by turning the airplane and looking out a side window. The two tubes beneath the fuselage are flare dispensers that were installed for Lindbergh's flights to Latin America and the Caribbean.

The Ryan Aircraft Corporation's Spirit of St. Louis is perhaps one of the most famous aircraft ever built. With Charles Lindbergh as pilot, it became the first aircraft to successfully fly across the Atlantic Ocean in May 1927. Its marathon 33-hour, nonstop, non-refuelled flight departed Roosevelt Field on Long Island, New York and when the plane landed at LeBourget Airport in Paris, France, Lindbergh became an international hero overnight. The Spirit of St. Louis was enshrined in the Smithsonian Institution's National Air & Space Museum, alongside the Wright Brothers' aircraft. "Spirit of St. Louis"

was named in honour of Lindbergh's supporters in St. Louis, Missouri, who paid for the aircraft. "NYP" is an acronym for "New York-Paris,"

SPECIFICATIONS:
Wingspan: 46 ft
Length: 27 ft 8 in
Height: 9 ft 10 in
Weight, gross: 5,135 lb
Weight, empty: 2,150 lb
Engine: Wright Whirlwind J-5C, 223hp
Manufacturer: Ryan Airlines Co., San Diego, Calif., 1927

Dividing the Old World from the New, the Atlantic Ocean has always been a barrier to trade between Europe and the Americas, and the commercial importance of an aerial link was realised long before it became a practical possibility. A flurry of activity in 1919 proved that the Atlantic could be conquered, but many years were to pass before it was tamed; the pioneer flights of Read (first crossing), Alcock and Brown (first non-stop crossing) and Scott (first crossings by airship) were a far cry from commercial operations which could offer the required degree of reliability with an economic payload.

During the 'twenties and 'thirties, many ingenious solutions were advanced to the problem of crossing 2,000 miles (3,220 km) of water, frequently in adverse wind and weather and with inadequate navigational aids. The route across the South Atlantic was a little easier than that farther north. From Dakar, in Senegal, to Natal, in Brazil, the distance was just under 1,900 miles (3,050 km), the weather was usually good and, in an emergency, the island of Fernando de Noronha, 300 miles (480 km) off the Brazilian coast, could be used for refuelling. The enterprise of French and German pioneers led to the establishment of air routes across the South Atlantic within a decade of the first Atlantic crossings-but not before the North Atlantic had witnessed another epic flight which, in public acclaim, outdid even the achievement of Alcock and Brown.

The first Atlantic crossings had, not unnaturally, been concerned with little more than getting an aeroplane and its crew across the shortest distance of water separating Europe and America. It was not long, however, before attention was turned to linking centres of population further inland, and as early as 1920 a prize of $25,000 had been offered for the first non-stop flight between Paris and New York (in either direction).

The first attempt to cross the Atlantic from east to west, against the prevailing westerly winds, was made in 1924, when three Douglas Cruisers left Brough, in Yorkshire, and two succeeded in reaching Labrador in stages, with lengthy intervening stops. Further attempts in each direction during 1927 took the lives of the Americans Davis and Wooster, the Frenchmen Nungesser and Coli, and two crew members of the Frenchman Fonck. Then, with little prior publicity, the young American Charles Lindbergh arrived in Paris on 21 May 1927, at the end of a 332-hour, 3,610-mile (5,810km) flight from New York. His was the first non-stop solo flight, and the longest trans-Atlantic flight to that date, qualifying for the 525,000 prize and resulting in a display of public adulation which today is more usually reserved for pop-stars.

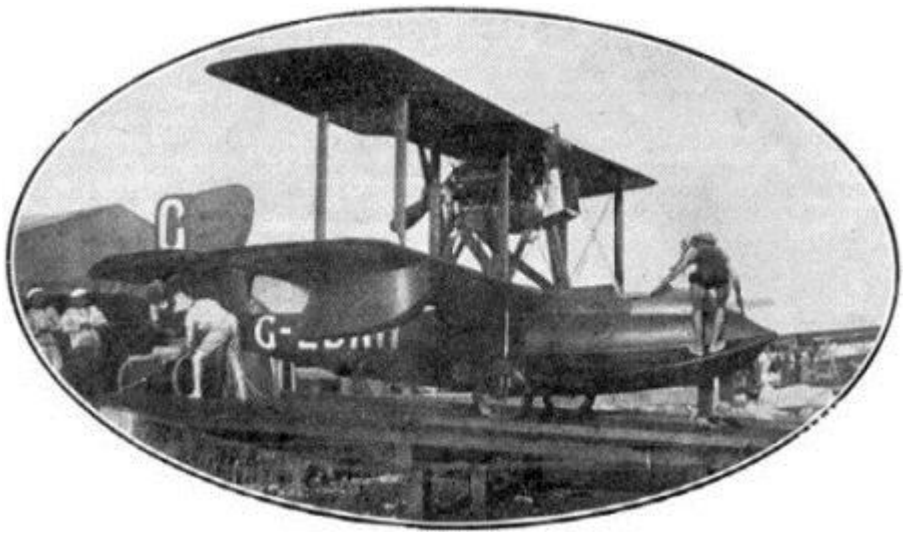
Lindbergh, 25 years of age and a pilot by profession, had a natural flair for flying and above-average ability as a navigator. He needed both in good measure through the long watches of the moonless night over the Atlantic, as he battled through icing levels, unknown winds and poor visibility. His flight not only demonstrated great personal skill and courage, but also vindicated his faith in the single 237 hp Wright Whirlwind engine which powered the specially-built Ryan NYP (New York-Paris) monoplane Spirit of St Louis. Apart from the engine and rudimentary cockpit, from which the only

forward view could be obtained through a periscope, the NYP was little more than a flying fuel tank, containing 450 US gallons (1,705 litres) in the fuselage and wings.

In Paris

Like most other Atlantic fliers of the period, Lindbergh made his take-off with the aeroplane loaded to a weight far above normal; the ability of the aeroplane to leave the ground at this weight in the length of runway available was unknown until the start of the flight. After a hazardous but successful take-off, Lindbergh flew north from Long Island to cross Newfoundland before setting course eastwards. His landfall, 28 hours after take-off, was only three miles (5 km) off course over the Irish coast, and the remainder of the flight, across the tip of Cornwall and on to Cherbourg and Paris, was uneventful.

Supermarine Sea Lion II



When Venice hosted the 1920 Schneider Trophy between September 19 and 21, the Italians found themselves unopposed, and Luigi Bologna completed the 230.68-mile course in a Savoia S.12bis powered by a 500-hp Ansaldo V-12 engine, flying at an average speed of 105.97 mph. Venice was also the setting for the next race, on August 6 and 7, 1921 -- and again it was dominated by the Italians. France entered only one plane, whose takeoff was cancelled when its floats were damaged. The winner, Giovanni de Briganti, flew a Macchi M.7bis flying boat with a 280-hp Isotta-Fraschini V-6A engine through the 244.9-mile course at an average speed of 117.85 mph.

At that juncture, if Italy could win one more Schneider race, it would keep the silver trophy. The next event was held in Naples between August 10 and 12, 1922. France sent two flying boats. The Italians entered the Macchi M.17bis and a new biplane flying boat, the Savoia S.51. Britain fielded only one entry, the Supermarine Sea Lion II, also a biplane flying boat, powered by a 450-hp Napier Lion II engine. In the course of the race the S.51 crashed, killing its pilot. Adding to the Italians' setbacks was the narrow victory won by the Sea Lion, flown at an average speed of 145.72 mph by Henry C. Baird.

Design Company:	Supermarine Aviation Works Ltd
First Flight:	1919
Sea Lion I:	1 - Supermarine (modified N.1B Baby)
Sea Lion II:	1 - Supermarine (modified Sea King II)
Sea Lion III:	1 - Supermarine (modified Sea Lion II)

Type Specification

Applies to:	Supermarine Sea Lion II
Type:	Single seat racing flying boat
Wing:	Equal span two bay biplane
Hull:	Wooden hull
Tail Unit:	Braced monoplane type mounted half way up the single fin with single rudder
Landing Gear:	None
Power Plant:	One 450 hp Napier Lion II engine mounted between the wings in pusher configuration
Accommodation:	Single open cockpit for pilot only

Dimensions

Span:	32 ft
Length:	24 ft 9 in
Height:	Unknown
Wing Area:	384 sq ft
Weights	
Empty:	2,115 lb
Loaded:	2,850 lb
Performance	
Max Speed:	160 mph
Endurance:	3 hr

Supermarine S.4

An advanced monoplane racer, developed by the British for the 1925 Schneider trophy race, was the Supermarine S-4. The Schneider race was an international event for seaplanes. The S-4 is a beautiful, highly streamlined, cantilever monoplane mounted on twin floats. The wing, constructed of a wooden framework covered with plywood, employed flush radiators that were not of the skin type. The wings had landing flaps that could be geared to the ailerons. The rear of the fuselage was of wooden semimonocoque construction, and the forward portion containing the engine was of metal.

The engine had 12 cylinders arranged in 3 banks of 4. The engine gave the appearance of the letter "W"; accordingly, this cylinder arrangement was referred to as a W-type engine. The characteristics of the aircraft contained indicates a drag coefficient of 0.0274, which must be considered quite low in view of the large amount of surface area of the exposed twin floats. The wing loading of about 23 pounds per square foot was high for the period and accounts for the use of the wing trailing-edge flaps.

Another important factor that allowed the use of such a high wing loading was the relatively long take off and landing runs possible with the use of rivers and harbours, as compared with the confined land airfields of the day. The aircraft was destroyed by wing flutter before the 1925 Schneider trophy race. The ailerons on the S-4 were unbalanced, which no doubt contributed to the onset of wing flutter at the high speeds of which the aircraft was capable. Flutter and divergence of cantilever monoplane wings

were not understood at that period in the development of aeronautical technology.

Later Supermarine racers, which were quite successful in subsequent. Schneider trophy competitions, employed the more predictable wire-braced monoplane wings. The designer of the Supermarine S-4, R. J. Mitchell, later designed the famous Spitfire fighter of World War II.

Design Company:	Short Brothers (Rochester & Bedford) Ltd
First Flight:	4 May 1927
Crusader:	1 - Short, Rochester
Type Specification	
Applies to:	Short Crusader
Type:	Racing seaplane
Wing:	Low wing monoplane. Wings of nearly elliptical plan with maximum chord and thickness at half span with bracing wires to fuselage and floats. Wings of wooden construction
Fuselage:	Fuselage of circular section is of wooden construction aft of cockpit and metal construction forward
Tail Unit:	Cantilever monoplane tail attached to fuselage with single fin and rudder
Landing Gear:	Twin single step floats of metal construction
Power Plant:	One 808 hp Bristol Mercury I 9 cylinder, single row, air cooled radial engine in nose
Accommodation:	Single seat for pilot in open cockpit at wing trailing edge
Dimensions	
Span:	26 ft 6 in
Length:	25 ft
Height:	Unknown
Wing Area:	120 sq ft
Weights	
Empty:	1,938 lb
All-up:	2,712 lb
Performance	
Max Speed:	270 mph

Supermarine S-6B

More than a million spectators were cheering as RAF Flight officer H.R.D. Waghorn set down his Supermarine S-6 in southern England's Solent Channel on September 10, 1929. Waghorn had just flown an average of 328 mph around the triangular course to defeat his Italian rivals and capture Britain's second straight Schneider Trophy win.

France, Italy and the U.S. had all won the Schneider trophy in the past, as had Britain. But none of the four had managed to win three out of five consecutive races, as required for retiring the trophy. Now Britain stood within reach of the elusive goal and, shortly after Waghorn's victory, Prime Minister McDonald vowed that England would do her level best to win the next race in 1931. But a few months later, McDonald's Air Ministry stunned the Aero Club of Britain -- sponsors of the country's Schneider Trophy entries -- by announcing the government would give no financial support to future Schneider trophy efforts. Without this financial support, the Aero Club could not develop a new racer to compete with heavily subsidized French and Italian challengers expected in 1931.

The British public was outraged. Their country's prestige was at stake. Soon several million pounds were raised to support the home team. Disaster struck the Italian and French teams. Mid-summer crashes claimed a top plane and top pilot from each. Crippled by these losses, both countries withdrew from the race a week before it was scheduled to be run. On Sunday, September 13, 1931, RAF Lieutenant John Boothman flew the S-6B, unopposed, over the Solent Channel course at an average speed of 340 mph. With courage, skill and a little bit of luck, England had retired the Schneider Trophy.

Was it worth all the money, work and heartache to claim a fairly ugly, now almost forgotten trophy? The British think it was. Because five years after the 1931 race, Reginald J. Mitchell introduced a new

Rolls Royce powered interceptor fighter incorporating many lessons he had learned designing Schneider Trophy seaplanes. Someone gave Mitchell's fighter a nickname, which stuck: "Spitfire."

Tilbury Flash

The "Tilbury Flash" was a regular at the air race circuit during the 30's. A rather plain aircraft flown by Art Carnahan, Flash won the 115 cu. in. engine event at Chicago in 1933. Her tiny 45 hp Church engine pushed her to 114.92 mph.

Thomas Morse R-5

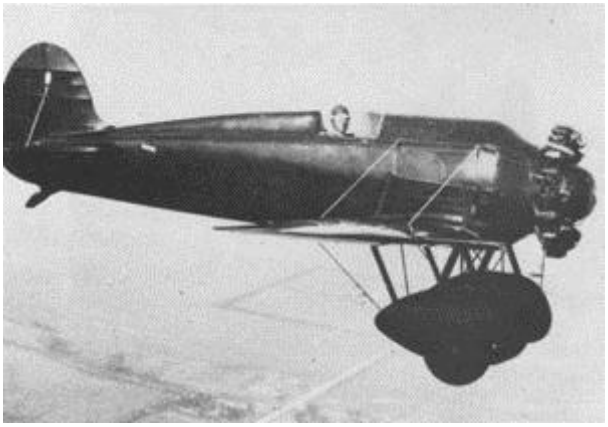
1921:- MB-3 converted to 1pOhwM; 400hp Wright-Hisso H-3 (>585hp Packard 1A-2025); span: 29'0" length: 25'0" v: 155; ff: 9/29/22 (p: Capt Frank O Hunter). Strut-braced, gulled, parasol wing. POP: 2 as R-5 military entries in 1921 Pulitzer races; [AS64373=A6070] (dropped out with lubrication problems) and [AS64374=A6071] (destroyed in crash during trial flight). One reportedly tested with 400hp Curtiss D-12, both subsequently destroyed in static testing.

This aircraft took part in the 1922 Pulitzer Trophy Race.

LT. CLAYTON BISSELL BESIDE THOMAS-MORSE R-5 RACER. TOP SPEED OF 179 MPH. BUILT IN 1922.

Travelair Mystery Ship

THE 1929 NATIONAL Air Race spectators witnessed the beginning of a new era in commercial aviation. This was in the form of a sleek racing job built by the Travel Air Company of Wichita, Kansas. This racer, whose design and construction began in 1928, earned the name Travel Air "Mystery Ship". Its design and construction was a closely guarded project at the factory and even as it landed at the Cleveland airport to participate in the 1929 air races, the racer was hastily rolled into the hangar and hidd*en* with a canvas cover.



One of the twelve short test hops flown by Travel Air test pilot Clarence Clark, (in cockpit), was conducted with the NACA cowl removed. On the initial test flight the cowl had broken loose and moved forward into the prop - as engineers had stressed the cowl for drag but not forward lift. It was a problem that plagued many early racers incorporating the then new NACA engine cowl.

Two young engineers, Herb Rawdon and Walter Burnham, designed the ship and under the guidance of Walter Beech, president and founder of the Travel Air Company, the racer was built rigidly to design specifications. It is a surprising fact that on its first test flight the racer exceeded the calculated airspeed by 15 percent.

The little red and black racer, low-wing in design, engine cowled with an NACA streamlined cover, and the wheels fully enclosed in streamlined pants was a picture of speed. During construction two other types of cowling were tried but the NACA type proved to be the most efficient. The Travel Air "Mystery Ship" not only introduced the NACA cowl and wheel pants to commercial aviation but also contributed toward the trend of low-wing military and commercial airplanes.

The fuselage was constructed of steel-tube and plywood covered, and the wings all wood and also covered with plywood. The wing span was 29 ft. 2 in. The first famous "Mystery Ship", NR614K - race No. 31, actually had two sets of wing panels. One set for closed course racing and the other for cross country flights and competition. The closed-course racing wings were about one and one half feet shorter in span and three inches narrower in chord. NR-614K's short wings were purchased by Shell and were used, as required, through Doolittle's No. 400. Fuselage length was 20 ft. 2 in. and it was 7 ft. 9 in. high. Its empty weight was 1,475 lbs. and a gross weight of 1,940 lbs. Part of the gross weight was accounted for by the 47 gal. fuel capacity and the six gallons of oil. This gave the racer a wing loading of 15.5 lbs./sq. ft. and with the 300 hp 975 cu. in. displacement Wright J6-9 that had been upped to over 400 hp, it had a power loading of 4.6 lbs./per hp. The increase in the Wright R-975 to 400 hp plus was obtained by augmenting the compression ratio and the speed of the supercharger. The sleek little speedster had a top speed of 235 mph and a landing speed of 73 mph.

On September 2, 1929, the "Mystery Ship", with its super smooth finish, was rolled out of the hangar and with Doug Davis of Atlanta, Georgia at the controls, lined up for the Thompson Cup Race - Event 26. Entering the low power racer in this event against the high powered military ships was like throwing it out to the wolves. But Davis proved to the world that the "Mystery Ship" could perform and went on to win the event at a speed of 194.9 mph (one lap flown at 208.69 mph). The military entries finished a bad second and fourth behind him, with speeds eight to 30 mph less than that of the "Mystery Ship".

This was the first time in the history of air racing that a civilian racer had outraced a military job. This was a big moment for the builders of civilian aircraft and at the same time opened the eyes of the military to the fact that some changes were dictated. The Army and Navy entries were modified high speed pursuits, revamped just for this race and the little Travel Air with far less power had won by a large margin - and in the course of the race had recircled one of the pylons.

The balance of 1929 and in 1930 the NR-614K appeared at many air meets around the states. Clarence Clark, who flew the original test flights on the "Mystery Ship", divided the cockpit time with Dale "Red" Jackson during those demonstrations. Both did an excellent job doing acrobatics and speed runs for the air fair crowds through-out the country. During the 1929 and 1930 tour the ship was sponsored by the Gulf Oil Company and travelled with the Curtiss-Wright Exhibition Company. The ship was unchanged in 1930, except for the Curtiss-Wright and Gulf Oil insignias. It did not make an appearance at the 1930 National Air Races.

It did appear at the 1931 National Air Races. Walter Hunter was the pilot and a new black and orange paint job changed the appearance of the racer. The ship caught fire in the air while Hunter was testing it prior to the Thompson Trophy Race and Hunter was forced to bail out. It was rumoured that the fuselage was gas soaked and that an area between the fire wall and engine was also fuel soaked. These areas should have been thoroughly cleaned, but not enough time existed before the race, and this was not done. This could have been the reason for the fire but the cause was never definitely determined.

Walter Hunter (in flying gear) acquired the 1929 Thompson Cup winning "Mystery Ship" NR6114K in 1931. Aircraft was damaged when Hunter purchased it from the Curtiss-Wright exhibition Co.

Travel Air produced a second "Mystery Ship" and it also was present and unveiled at the 1929 National Air Races. This one was powered by a six cylinder Chevrolair, manufactured by Arthur Chevrolet Aviation Motors Corporation of Indianapolis, Indiana. This was a test model six cylinder inverted inline engine. Designated the D-6 it developed 165 hp and 2175 rpm, was air cooled and had a 508 cu. in. displacement. The Chevrolair powered "Mystery Ship" has the same dimensions as 614K. The cowl to fuselage flare used on 614K was not needed on 613K as both fuselages were built for inline engines.

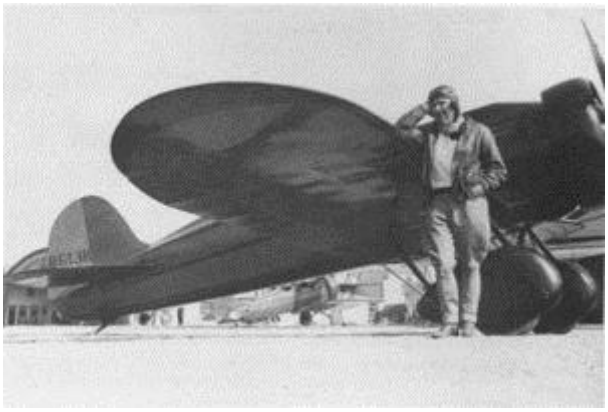
Chevrolair powered NR613K was entered in several events at the 1929 Nationals. The six cylinder experimental engine produced over 200 hp, but various engine problems prevented the racer from showing its full potential. After the Nationals a Wright J6-7 was installed.

This "Mystery Ship" was painted red and carried license number NR613K and race No. 32 for the 1929 Nationals. Both of these ships were known as the "Mystery S" but were actually Travel Air Low-Wing R's. Doug Davis flew the Chevrolair powered job to first place in the Experimental Ship Race. He turned in a speed of 113.38 mph to beat out Ed Heath in the "Baby Bullet", H. A. Speer in a Barling NB-3 and H. S. Myhres in a Wright J-6 powered Simplex monoplane.

After the 1929 National Air Races the Chevrolair engine was pulled out of the "Mystery Ship" and sent back to the Indianapolis factory and the airframe was shipped back to Wichita. At Wichita a Wright J6-7 was placed in the ship and was purchased by the Barnes family. They made the purchase through an aircraft dealer in Los Angeles. The ship was now painted yellow and red and appeared from time

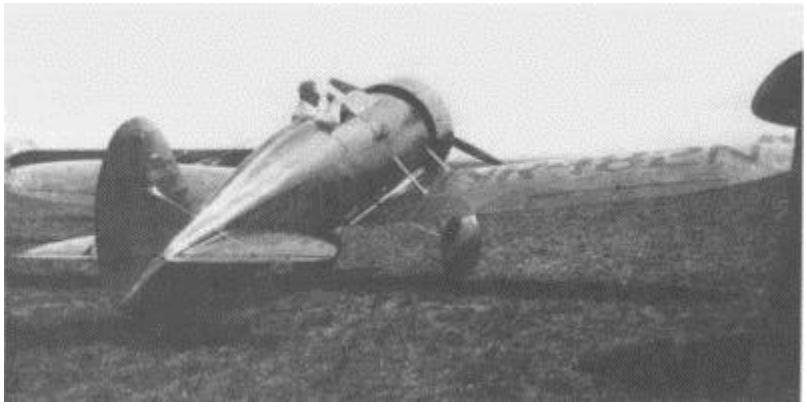
to time with a townsend ring covering the Wright. Pancho Barnes flew the ship to many records on the west coast and appeared at one race meet at Kansas City. She flew the ship with or without the speed ring as well as with the long and short wings. Pancho Barnes used the short wings when setting a woman's speed record August 5, 1930 at 169.19 mph.

NR-613K was bought by Paul Mantz and was used in many aviation movies, playing the part of foreign fighter aircraft, Schneider racer and many others.



Pancho Barnes with 613K after the inline engine had been removed and a Wright radial installed. Several years ago Barnes' son acquired the racer and planned on restoring it to original 1930 configuration but he was killed before restoration was completed.

In 1930 the Shell Oil Company ordered a Travel Air "Mystery Ship" to be used at air races and meets to advertise their products. Jimmy Doolittle and Jimmy Haizlip gave stunting exhibitions with the racer and Haizlip flew it in the 1930 Thompson Race. The ship was licensed NR-482N and was identical to the 1929 "Mystery Ship" except that the NACA cowl had been lengthened. The racer was painted with the Shell colours of red and yellow and carried race No. 35 for the National Air Races in 1930. Jim Haizlip flew the Shell job to a first spot in the 1,000 cu. in. displacement race, clocking 183.36 mph, and placed second behind Speed Holman in the Thompson Trophy Race with 199.80 mph. He trailed the Laird flown by Holman by only two miles per hour.



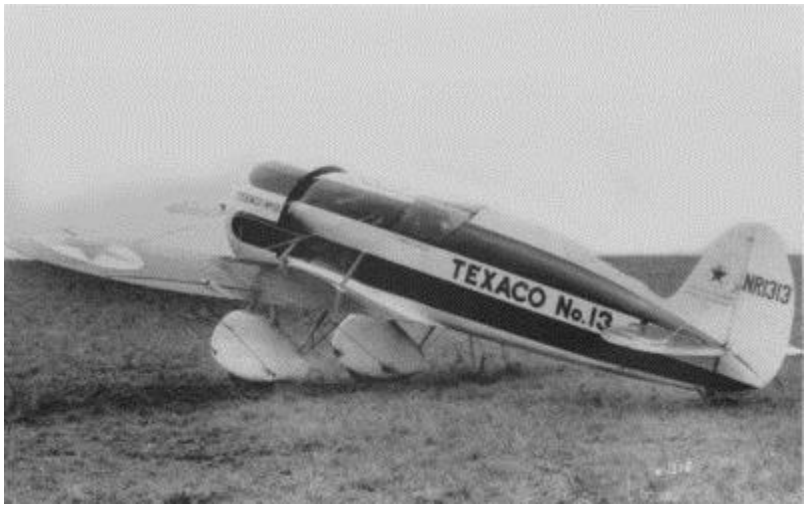
Ordered by Shell Oil Company in 1930, Jimmy Doolittle and Jim Haizlip flew Travel Air NR482N before thousands at air shows and race events. Haizlip flew this aircraft to second place behind Speed Holman in the 1930 Thompson in Chicago.

Later in the season the ship picked up race No. 26 and was raced throughout the United States by Doolittle and Haizlip. In May, 1931, Haizlip and 482N finished two laps ahead of his nearest competitor. As an added thrill for the crowd, he flew the last few miles and finished the race in an

inverted position. The second and third spots went to Casey Jones flying a stock Cessna and Art Davis in his Waco.

"Texaco 13" as originally painted. Following a crack-up shortly after delivery, the aircraft was repainted as shown below, and retained this colour scheme throughout its career.

A fourth "Mystery Ship" was purchased by the Texaco Company and was perhaps the most famous of the five. This was Frank Hawks' "Texaco 13". Frank Hawks had flown Mr. Hull, president of the Texas Pipe Line Co., and won a berth as superintendent of aviation for the Texas company: "Texaco 13" was identical to the other "Mystery Ships", but included a cockpit full of special instruments for long distance flights, so the ship was heavier than the other three. The cockpit was fully enclosed and almost flush with the top of the fuselage. The racer was painted a Stearman vermilion and white, with a blue stripe separating the red and white. The ship had two different paint jobs, the first being on the ship a very brief period. Hawks hit some wires and cracked the ship up. It was repaired and repainted at this time. On two other occasions he cracked the ship up, one time injuring himself very, seriously. He never did well at the Nationals as his plane was not set up for pylon type racing. However, he raced at the 1930 National Air Races, his "Texaco 13" wearing their Texaco shorter racing wings - race No. 28. This wing switch was made at the factory prior to the races. Hawks entered the Thompson Trophy Race but pulled out of the race on the third lap. A piece of masking tape placed over the gas cap (for streamlining) caused a loss of pressure and the engine would not operate at full throttle.



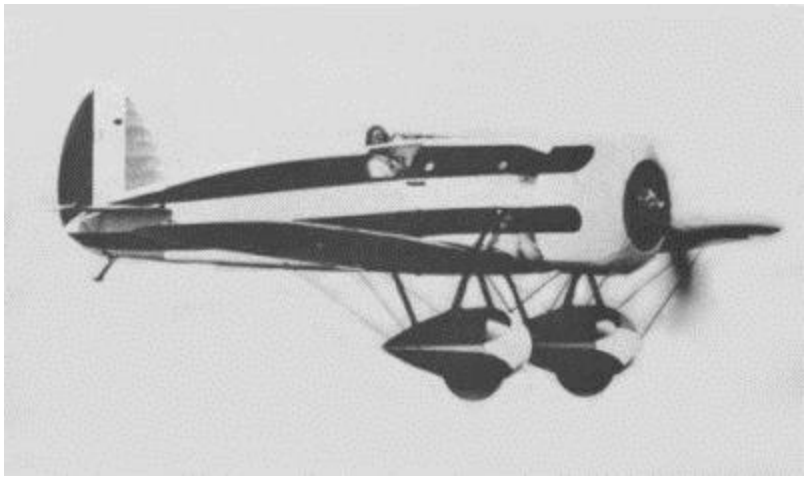
"Texaco 13" at Wichita in March 1931. Hawks had just arrived to swap the short racing wings for the longer span cross-country panels. The Travel Air Company was conducting wheel pant modifications before changing the wing panels when this picture was taken. The short wings were originally installed in mid-August of 1930 and were test hopped by Clarence Clark prior to Hawks' departure and entry in the 1930 Chicago National Air Races.

But Frank Hawks and the Travel Air "Texaco 13" did set *hun*dreds and hundreds of cross country records. Not only in this country but also in England and Europe. The European pilots were amazed at the records he set day after day. They had been setting records over short courses but had nothing that would take this long day after day gruelling grind. After Hawks' death, in another aircraft, the racer was given to the Chicago Museum of Science and Industry where it hangs as a symbol of the racing airplane that started the trend toward low-wing military and commercial airplanes.

Frank Hawk's "Texaco 13" at the 1930 Chicago National Air Races. Dropped out of Thompson in third lap. During 1930-19332 Hawks set hundreds of national speed records with this aircraft which now hangs in the Chicago Museum of Science and Industry.

The fifth "Mystery Ship" was built for the Italian government. Many of the later Italian fighters were direct copies of this ship and scored victories for their air force.

The history of the Travel Air "Mystery Ships" was short, but the aircraft's imaginative design set a trend for racing, military and civilian aircraft that left a permanent mark in the history of speed and air racing.



The fifth "Mystery Ship" was built for the Italian government and undoubtedly influenced later Italian aircraft design.

reproduced from 'The Golden Age of Air Racing' by S.H. Schmid and Truman C. Weaver

Verville-Packard R-1

Alfred Verville prominent in many major American aircraft developments from 1914 well into 1930s. Sportsman was one of series of excellent Verville designs dating back to early 1920s. His earlier successes included designs for tunnel radiators and tapered wings used on Boeing PW-9 and Curtiss PW-8 fighters and his own VCP-1 fighter which was modified into Verville Packard R-1 racer which won first Pulitzer Speed Trophy Nov 20 at 178 mph.

This was the first racing aircraft built for the USAAC, a clean biplane. It was the modified VCP-1 fighter prototype.

Type: R.1
Function: racing
Year: 1920 Crew: 1 Engines: 1 * 638hp Packard 1A-2025
Speed: 299km/

Verville-Sperry R-3

The Verville Sperry R-3 is an almost perfect example of the opportunity cost of an inadequate development program. Designed by Alfred Verville, a kindly genius who had a penchant for just missing the brass ring of commercial success, the R-3 was years ahead of its time when it first appeared in 1922 as a certain winner for the Pulitzer Trophy Race.

Here was a racer, contemporary with the Thomas-Morse biplane pursuit, which featured a cantilever wing, streamlined fuselage, and fully retractable landing gear, clearly presaging the mid-1930s formula of the Messerschmitt, Hurricane, and Spitfire. However, it also evoked some political problems that might be analogous to the current F-16/F-20 controversy. The Verville was developed by the McCook Field Engineering Division and manufactured by the Lawrence Sperry Aircraft Company of Farmingdale, New York. Three aircraft were purchased, and on them, the aircraft builders intended to use the silky-smooth 450-horsepower Curtiss D-12 engine and the all-metal Curtiss Reed propeller. Fundamental to the design was the use of the patented Curtiss wing radiators, thin brass sheets that conformed to the airfoil.


Mechanics at work on the Verville-Sperry Racer

It happened that the foremost aircraft manufacturer of the time was the Curtiss Aeroplane and Motor Company, which was also building the sleek series of racing biplanes. As a political result, the R-3 was fitted with the 300-horsepower Wright H-3 engine, notorious for its vibration. A stock wooden propeller and "lobster pot" Lamblin radiators were installed. With these totally undesirable modifications, the airplanes were no longer competitive, and first and second pieces were won by the sleek Curtiss biplanes using the preferred engine/propeller/radiator combination.

All three R-3s started the race, but only two finished. Lieutenant Eugene Barksdale finished fifth at a little better than 181 mph. Lieutenant Fonda B. Johnson finished seventh, his engine freezing solid immediately after landing. The legendary Lieutenant Saint Clair Street broke an oil line and had a

forced landing, damaging the airplane.

Development of the aircraft ceased for all practical purposes, despite the large investment. There were several problems with it--incipient flutter, the drag induced by the open wells of the retracted wheels, a general lack of harmony in the controls--that would have been eliminated by a series of tweaking test flights or in the wind tunnel. For political and economic reasons, these remedial procedures were denied.

A Curtiss D-12 engine was installed in the plane or the 1923 Pulitzer, and while vibration was no longer a problem, there were still handling difficulties, especially at top speed, now reaching 233 mph, The airplane had to withdraw from the race. Once again, a Curtiss biplane was the winner.

Again, no substantial development work was invested in the design, and it was with some misgivings resurrected for the 1924 Pulitzer, when the preferred entry--a Curtiss biplane--crashed. Ironically, the R-3, piloted by Lieutenant Harry H. Mills, won the race at a slow speed of 215 mph. The racer was almost immediately relegated to the McCook Field Museum, where it was ultimately burned. The R-3 remained merely another exciting, unfulfilled concept.

Virgin Atlantic Global Flyer

touchdown at Salina, Kansas

This warm and bright day in Salina, Kansas will go down in history as the day that Steve Fossett set a great aviation world record for speed around the world solo, non-stop and non-refuelled.

After 67 hours and 1 minute of gruelling sleep deprivation and 12 unappealing diet milkshakes, Steve finally touched down in front of an excited crowd of public and press at Salina Municipal Airport at 19:48:56UTC, despite having some very worrying problems earlier in the flight.

At the start of the flight, Steve experienced intermittent failures with the Global Positioning System and then, as the flight continued, fuel readings indicated that the aircraft had lost a significant amount of fuel shortly after take-off. Both of these problems were serious threats to the flight's continuation. It was 'touch and go' at times, but Steve seemed to have luck on his side, with good tailwinds pushing him along across the last leg of the Pacific Ocean.

As Steve exited the cockpit and waved to the crowds, he managed to gingerly stand up and walk even though he, as expected, appeared to be weary and tired. His happiness at completing the attempt and getting back on the land to see his wife Peggy, however, was obvious and his smile said it all.

When asked how he was feeling, Steve remarked: "That was a difficult trip. I mean it was one of the hardest things I've ever done. To be on duty for three days and night with virtually no sleep." Steve added: "I was in control and I think I was able to make rational decisions and didn't make major errors, which is a great danger when you get this tired." He was very relieved and added, "It happened successfully and on the first attempt."

Despite admitting that he did not sleep at all in the first day and only had half a dozen naps for the rest of the time, Steve said: "I feel great. Well, yes I could do with a shower and I could do with a little sleep, but I really do feel great."

Steve added that he was looking forward to having a real dinner after all those milkshakes.

Of the crowds Steve said: "I do these things because I want to do them for my self esteem and my personal satisfaction, and this is the first time a big crowd has come out to support me on a project and in the records that I do. I think that's a really good sign that all these people share the enthusiasm and excitement for an airplane adventure."

Steve said the record was "the most important aviation record yet to be done, but it's not the last important record...I'm not ready to announce any new projects, but, in fact, I have three projects in planning right now."

Sir Richard Branson, who was there to congratulate Steve immediately on disembarking from the aircraft, gave him a high five and soaked him in champagne. Later Richard, who can now have his watch back, said: "I poured the champagne over him to try and cool him down a bit...he stinks to high heaven."

Of Steve's condition Richard added: "He is wide awake. I just asked him whether he might go back and have a sleep and he said "no I plan to party," so I suspect he'll still be going for another 24 hours."

Richard also maintained that Steve is just relieved to be alive and thought that Steve began to relax and enjoy the flight when he had crossed the Pacific Ocean.

The entire Mission Control team was there on Steve's arrival. Jon Karkow, from Scaled Composites, thanked everyone involved in the project and said: "It's been a real team effort." And when Steve was

reunited with Kevin Stass, Mission Control Director, all he needed to say to the man who has guided him throughout the flight was "what a job".

Although the flight has been recognized as the first solo trip around the world by Guinness World Records, it is still to be sanctioned by the National Aeronautique Association (NAA). When it is, it should be recognized as the fastest non-stop, non-refuelled circumnavigation ever.

Scaled Composite's 'Model 311' aircraft is a single engine turbofan aircraft specifically designed for non-stop global circumnavigation by a solo pilot with no passengers. The 'Voyager' aircraft which took Dick Rutan and Jeanna Yeager around the world non-stop could well be considered 311's 'big sister', but evolution and invention on the part of Burt himself and Jon Karkow has certainly played its part in making this aircraft unique.

Aerodynamics are key to this aircraft, and its configuration is optimised for range and fuel efficiency. The aircraft's aerodynamics have been designed using extremely sophisticated computing technology that uses computational fluid dynamics to predict how the aircraft's surfaces will behave in flight. The aircraft is so aerodynamically perfect, that the only practical way to descend is using drag parachutes, like the ones in the picture above. As the aircraft is only required to land once, these won't be detachable and will take time to reset.

The aircraft is a trimaran-like construction with two huge external 'booms' which hold the landing gear, and 5,454 pounds of fuel on either side of the pilot's cockpit in the centre on top of which is the single Williams turbofan jet engine. The construction materials used for the structure of this aircraft are all graphite/epoxy. The stiffest carbon fibres are used in the construction of the wings, and the skin is a sandwich of graphite/epoxy and Aramid honeycomb.

The aircraft doesn't have what is known as 'de-icing' or 'anti-ice' measures. This means that it will be unable to fly in 'icing' conditions. In addition, it won't cope with turbulence very well in the early part of the flight when the aircraft is heavy and structural margins low; so weather will be an important factor in choosing when and where to take off from.

The pilot, Steve, will sit in the main fuselage, the centre pod, just behind the nose landing gear and below the engine. He'll also be sitting in front of the main fuel header tank which feeds the engine. Early on in the project, there were huge obstacles to overcome caused by siting the engine so close to the pilot concerning noise levels. Quite frankly,... it was too loud! Fortunately that's been overcome now. Steve will also be sitting in a pressurised cabin because of the altitude he will be flying at, which will give him a 'cabin altitude' of 10,000 feet at the 45,000 feet he'll actually be flying at.

The cockpit itself is a mere 7 feet long. It is equipped with a reclining carbon fibre seat. However, to get a good enough view for take off and landing, Steve will need to sit on cushions as the seat isn't high enough.

There are thirteen fuel tanks all in all, and on take-off, it is expected that this aircraft will be 83% fuel by weight. Which must be a world record surely? Getting fuel to where it's needed whilst maintaining the balance and stability of the aircraft is a feat that will require constant supervision and monitoring. The fuel itself will be a special fuel that has a much lower freezing point that regular aviation fuel.

Wing Span: 114ft
Wing Area: 400ft squared
Length: 44.1ft
Height: 13.3ft
Gross Weight: 22,000 lbs
Empty Weight: 3,350 lbs

Voisin

1909 Voisin

Gabriel and Charles Voisin were among Europe's leading pioneer aviators. Gabriel began his formal aviation career in 1903 when he was engaged by a prominent French aeronautical promoter, Ernest Archdeacon, to build gliders for him. In 1905 he formed the first commercial aircraft manufacturing company in Europe with the soon-to-be famous Louis Blériot. Numerous disputes between the two quickly arose, however, and Voisin bought out Blériot's interest in the venture in 1906. He immediately reformed the company with his brother Charles, thus establishing the highly successful Appareils d'Aviation Les Frères Voisin. The firm's first truly successful airplane appeared in 1907.

The classic Voisin pusher biplane design of 1907 was one of the most significant aircraft of the pre-World War I era. Many of Europe's leading aviators flew the Voisin. On January 13, 1908, Henri Farman made the first one-kilometer circuit in Europe with a Voisin biplane, winning a 50,000-franc prize and much acclaim for the Voisin product. By 1912, Les Frères Voisin had produced more than 75 airplanes that were based on the simple and sturdy 1907 design.

On 5th October, 1914 the Voisin III, became the first Allied plane to shoot down an enemy aircraft.

Voisin became the standard Allied bomber in the early years of the war. Successive models were more powerful and over 800 were purchased by the French Army Air Service. The Royal Flying Corps and the Russian and Belgian airforces also used them in the war. The Voisin V first appeared in 1915. It was the first bomber to be armed with a cannon instead of a machine-gun.

Wingspan	18 m (59 ft.)
Length	11,2 m (37 ft. 9 in.)
Height	3.2 m (11 ft. 6 in.)
Weight	1,325 kg (2,900 lb.) empty

In 1912, the Voisin brothers developed a version of their successful design for the military. Thereafter they built aircraft almost exclusively for military contracts. The Voisin 1912 Type, as it was referred to by the French military, also sometimes identified as the Voisin Type 1, launched the standard configuration of almost all Voisin aircraft throughout the war. Designated the Type L by the Voisin factory, this seminal airplane was an equal-span biplane with no dihedral, with a short nacelle carrying the crew of two in front and an 80-horsepower Le Rhône 9C engine at the rear. A cruciform tail was attached to the wings with a set of booms, and it had a quadricycle landing gear. A second pre-war military design, similar to the Type L, powered by a 70-horsepower Gnome 7A engine, was produced in 1913. Although they were largely obsolete by the start of the war, the sturdiness and the reliability of these, and subsequent, Voisin aircraft enabled them to form the backbone of the French night bomber force until late in 1918.

Les Frères Voisin was conservative in its design philosophy. There were only slight, incremental design changes in the airframes during the war. Improvement in performance of the successive types was made principally by installing more powerful engines, usually necessitating wings of greater span. The first wartime version, the Voisin 3, powered by a 120-horsepower Salmson M9 engine, had a range of 200 km (125 mi), carrying a bomb load of 150 kg (330 lb). The 1918 Voisin 10 by comparison, which in outward appearance looked much like the Voisin 3, had a range of 350 km (220 mi) with a bomb load of 300 kg (660). The 280-horsepower Renault 12Fe engine of the Voisin 10 gave it a maximum speed of 135 kph (84 mph) at 2,000 m (6,562 ft) altitude, 37 kph (23 mph) faster than the Voisin 3 at the same altitude.

During the war, the Voisin pusher series performed a variety of missions, including reconnaissance, artillery spotting, training, day and night bombing, and ground attack. The first recorded armed aerial victory of the war occurred on October 5, 1914, when a French pilot and his observer, flying a Voisin 3, downed a German Aviatik B.1 with bullets fired from a Hotchkiss machine gun.

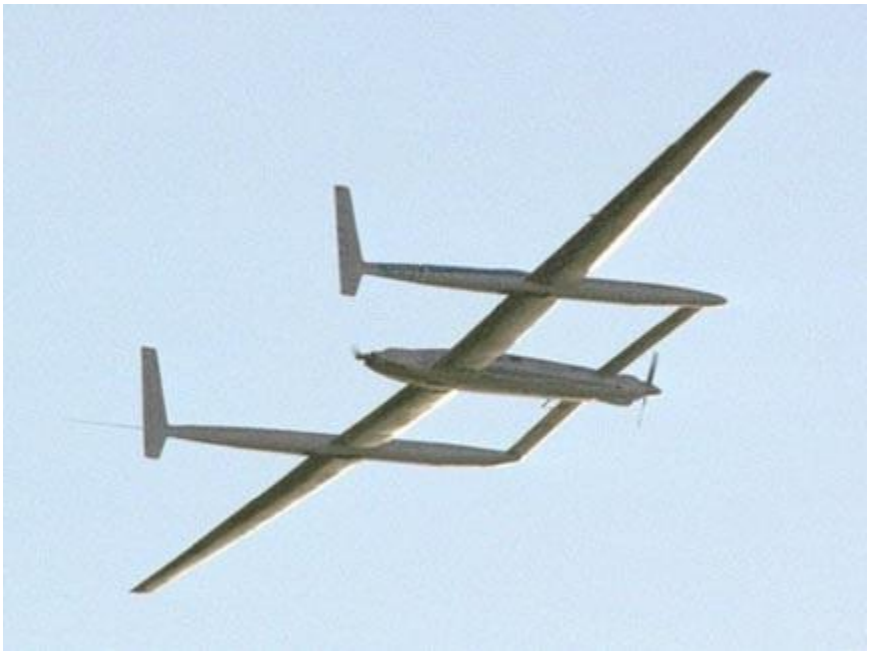
The Voisin 3 is also notable in having equipped the first dedicated bomber units. Voisin 3 units staged a retaliatory attack against the Badische Anilin Gesellschaft at Ludwigshaven, Germany, on May 26, 1915, shortly after the German Army introduced poison gas in battle. Successful daytime attacks on targets within Germany ensued, but by 1916 the Voisin 3 and its immediate successors became vulnerable to new, better performing, German fighters. (The Voisin Type 4 was similar to the Type 3, but was fitted with a 47 mm cannon and used primarily for ground strafing. The Types 5 and 6 were virtually the same as the Type 3, except that they had more powerful Salmson engines.) The Voisins

were slow and with their pusher configuration they were defenceless from the rear. Despite these limitations, these rugged and reliable aircraft still had a role to play. Voisins were used as trainers and for night missions for the remainder of the war. Voisin pusher aircraft were supplied to, or built under license by, twelve countries, including Britain, Russia, Italy, and the United States.

The Voisin Type 8 entered service with French night bombing squadrons in November 1916. (The Type 7 was a transitional model of which only about a hundred were built.) The Type 8 was intended to be powered by a 300-horsepower Hispano-Suiza engine, nearly double the output of the 155-horsepower Salmson used on the Type 6. But the Hispanso-Suizas were not available in sufficient numbers, and a 220-horsepower Peugeot 8 Aa inline was substituted. To accommodate the bulkier and heavier Peugeot, the Type 8 required an enlarged and strengthened fuselage, and greater wingspan. It was fitted with either a single machine gun or a 37 mm cannon.

The new engine provided a nominal increase in performance over the Voisin Type 6 while carrying the same bomb load of 180 kg (396 lb); but it was unreliable. Voisin then developed the Type 10, which combined a lighter and more powerful 280-horsepower Renault 12Fe engine with the Type 8 airframe. The Type 10, with improved range, speed, and bomb load, replaced the Voisin Type 8 early in 1918. (Only one Type 9 was built. It was a modified Type 8 with 160-horsepower 8G engine intended for reconnaissance.)

Rutan Voyager



Voyager aircraft return from its round-the-world flight.

Dick Rutan and Jeana Yeager embody the very spirit and character of the word "pioneers." In December 1986, they became the first people to circumnavigate the world, non-stop, without refuelling their plane, the Voyager. They also set world flight records in the process. Besides being the first team to travel non-stop around the globe--which was one of aviation's last record barriers--Rutan and Yeager also endured the longest flight to that date, and almost doubled the then current distance flight record. But their contributions did not stop there. They also explored the limits of human endurance and mental fatigue during their journey. To many, Rutan and Yeager's flight represented the triumph of human ingenuity as the two aviators overcame a wide range of aerodynamic, financial, physical, and psychological challenges.

Richard "Dick" Rutan was born in Loma Linda, California, on July 1, 1938. An eager individual, Rutan earned both his pilot's and driver's licenses on his 16th birthday. At the age of 19 he joined the Air Force Aviation Cadet Program and was later commissioned a lieutenant in the Air Force. He flew 325 missions over Southeast Asia during the Vietnam War until September 1968, when his F-100 plane sustained a hit from enemy fire and he had to eject from his aircraft. He evaded capture and was rescued by American forces. Due to his exemplary military record, Rutan received the Silver Star, five Distinguished Flying Crosses, 16 Air Medals, and a Purple Heart.

The second Voyager pilot Jeana Yeager was born in Fort Worth, Texas, on May 18, 1952. By 1978, she had earned her pilot's license. During her early aviation career, Yeager mainly wanted to learn to fly helicopters, but her interests branched off and she turned her attention to high-performance aircraft. Yeager, who is no relation to the famous test pilot Chuck Yeager, first met Dick Rutan, and his brother Burt, at a California air show in 1980. At the time, Burt and Dick ran their own aircraft company. Interestingly, Yeager set four separate speed records in Rutan EZ planes in the early 1980s.

The Rutans originally conceived of the Voyager during a lunch in 1981. They believed that they could design a plane that could break the world distance record of 12,532 miles (20,168 kilometres) set by a B-52 Air Force crew in 1962. Like many great innovators, they quickly sketched their ideas onto a napkin while still at the lunch table. With the help of an eager group of volunteers, they began building the Voyager the next year. Notably, the entire project relied solely on private funds and donations.

The creation of the Voyager posed several design challenges for the Rutans. Burt, the main project engineer, searched for just the right combination of materials to make the aircraft light enough to reach maximum efficiency and yet strong enough to sustain extremely long-distance flight. He also had to devise a way for the aircraft to hold the enormous amount of fuel necessary to power it, non-stop, around the globe. Eventually the Rutans decided to construct the Voyager's main structure/fuselage out of a space age composite material consisting mainly of graphite, Kevlar, and fibreglass. The structural weight of Voyager was only about 939 pounds (426 kilograms), but when its 17 fuel tanks were full, its takeoff weight exceeded 9,700 pounds (4,400 kilograms), or more than 10 times its structural weight. Voyager's wingspan was approximately 110 feet (36 meters). By the time the Voyager made its first test flight on June 22, 1984, the Rutans, Yeager, and scores of volunteers had spent more than 18 months and 22,000 hours working on the aircraft. After more than a year-and-a-half of testing and modifications on Voyager, Dick Rutan and Jeana Yeager were ready to attempt their record-setting flight.

Rutan, Yeager, and Voyager took off from Edwards Air Force Base, California, at 8:01 a.m. on December 14, 1986. The plane needed almost the entire 15,000 feet (4,572 meters) of runway, which was already one of the world's longest airstrips, to become airborne; the aircraft did not lift off until it

was approximately 14,200 feet (4,328 meters) down the runway, and then it did so only after sustaining a bit of damage. Due to the large amount of fuel contained in Voyager's wing tanks, the aircraft's wings bobbed up and down while accelerating down the runway, and in the process, about a foot of each wing tip chipped off. Concerned about the condition of their craft, Rutan and Yeager circled the airfield and checked their plane's handling conditions. Fortunately, the plane seemed sound enough to continue the journey.

Yeager and Rutan had to endure severe physical and mental demands during their trip. Because of the time required to make a circum-navigational flight, they became extremely fatigued. To combat the problem, they tried to rotate their duties. One crewmember would fly the aircraft, while the other rested. Initially, they tried to work in two-to-three-hour shifts, but things did not always go according to plan. Furthermore, it was extremely difficult to manoeuvre themselves into a comfortable sleeping position, particularly within the confines of Voyager's small cockpit, which was only the size of a phone booth.

The two aviators faced several dangers during their flight. One of their greatest challenges was bad weather. At several points during their trip, they had to evade menacing storm fronts. Once, they even had to fly around Typhoon Marge, a 600-mile (966-kilometer)-wide storm. While such manoeuvring helped them escape physical harm, it only added to their mental stress. Each time they had to adjust their flight plan by climbing above a storm, or going around one, they burned more fuel, and since Voyager had started the trip with a very tight fuel allotment, they grew increasingly concerned that they might not have enough to complete their journey. As it turned out, they had enough fuel, but just barely.

Rutan and Yeager completed their journey when they touched down at Edwards Air Force Base at 8:06 a.m. on December 23, 1986. The entire 24,986-mile trip had taken 9 days, 3 minutes, and 44 seconds, or a little more than 216 hours. During their trip, they had averaged around 116 miles per hour (187 kilometres per hour), and when they landed, they only had a few gallons of fuel left.

From a record standpoint, Rutan and Yeager became the first aviators to circumnavigate the globe non-stop, without refuelling. They also endured the longest flight up to that time, and essentially doubled the previous flight record for distance. Because of their accomplishment, President Ronald Regan awarded the Rutan brothers and Yeager with the Presidential Citizen Medals of Honour, which had been awarded only 16 times previously. They also received the Collier Trophy, aviation's highest honour, and several other prestigious awards.

In the late 1990s, Dick Rutan attempted to set another around-the-world record, this time in a balloon. Rutan and his team-mate David Melton began preparing for the journey when they learned that the Anheuser-Busch Company was offering $1 million to the first team of balloonists who could successfully circumnavigated the world, non-stop. In 1998, Rutan and Melton set out on what they believed would be a record-setting journey, but only three hours into their flight, a helium cell ruptured in their balloon and they had to abandon their trip. Another team of balloonists, sponsored by the Breitling watch company, would beat them into the record books in March 1999.

The Voyager now hangs in a place of honour in the "Milestones of Flight" gallery in the Smithsonian's National Air and Space Museum in Washington, D.C. Its 1986 flight revealed just how far aeronautical engineering and design had advanced during more than 80 years of aviation. Rutan and Yeager not only established a couple of world records with the Voyager but also tested the psychological and physiological capabilities of humans under extreme pressure. Rutan and Yeager's flight proved that people really can live up to Rutan's personal motto: "If you can dream it, you can do it."

Wingspan	33.8 m (110 ft. 8 in.)
Length	8.9 m (29 ft. 2 in.)
Height	3.1 m (10 ft. 3 in.)
Weight	1,020 kg (2,250 lb.) empty

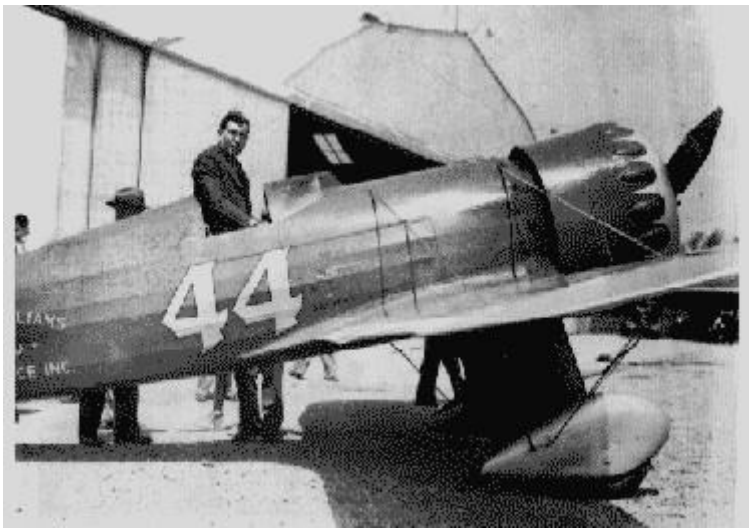
Wedell Williams No.44

JIMMY WEDELL (PRONOUNCED WE-dell) who had only a ninth grade education, couldn't read a blue print and was denied Army and Navy pilot training, not only became one of the great race pilots of the country, but also one of the greatest and most prolific designers and builders of racing aircraft. During the period 1931 to 1936 the Wedell-Williams race jobs took more than their share of firsts Second. third and fourth places were also filled by Jimmy's speed steeds.

Born in Texas City. Texas on March 31, 1900, James Roben Wedell's father. a bartender on the tough water front) and his mother died when he and his younger brother, Walter, were infants. Thus, from the start, the two brothers were on their own. Jimmy was very interested in gasoline engines and at an early age started working for an auto mechanic. Later using a 10 ft. x 10 ft. building, he opened his own garage. Granted this was not large enough to get the flivvers in. but the rent was cheap and Jim was able to work on the auto outside the building.

During the same period. Walter became a telegraph operator for the railroad. Despite the difference in jobs. when the two brothers got together. aviation and flying were the main topics of conversation. Finally, Jim scraped together enough money and purchased two old Thomas Morse airplanes. Both planes were basket cases and needed r rebuilding. But Jim met the challenge, rebuilt them and then had Francis Rust, an old barnstormer, give him one hour of flight instruction. From this point forward Jim and the Thomas Morses were on their own.

He taught Walter to fly and the two barnstormed throughout the Gulf Coast area. But money was scarce and Walter joined the Navy as a telegraph operator for a four year hitch. At this point, Jimmy travelled south into Mexico and became known as the "Air-Hobo" from Texas. He had lost the sight of one eye during his youth, the accident occurring during a wild motorcycle ride, but Jim continued with life just as if he had the sight of both eyes and was given the name Senior Don Jaime, El Gatilan De La Noche-Sir James, the Night Hawk. He was the one living pi lot who could attend a very wild party, lace a foundation of Mexican beer with Mexican tequila and then jump into his airplane, fly through the dark Mexican sky and land on a rutted landing strip of sand, cactus and mesquite, lighted only by small flares or flashlights.



When Walter finished his hitch in the Navy he joined Jimmy in Mexico and using two airplanes they flew many mysterious midnight missions. Although many of these were questionable, involving guns, liquor, contraband, Mexican Generals and revolutions, Jim and Walter were never in real serious trouble. At least none that they couldn't fly out of.

It appeared that everything the Wedell brothers did had to be spectacular, so when Walter and Henrietta Filiberto of New Orleans decided to get married in 1929, and they agreed that the wedding should take place in the air. They gave it the full treatment with flower girls spreading the flowers to the Ryan wedding plane. Jimmy was the pilot and also best man. The music was furnished by a local radio station so that all in the New Orleans area could listen.

The indomitable Roscoe Turner and his parachute equipped lion cub. Roscoe, always the colorful character, had a great flair for publicity and although his natty aviator's' uniform may have annoyed many in the aviation fraternity, it did get the attention of newspaper reporters and newsreel cameramen. Many distance records were set by Roscoe in the "Gilmore Lion", a Lockheed Air Express.

It was in this wild period that Jimmy began to get ideas about planes he was flying and what he might do to improve their performance. He contacted Harry Palmerson Williams, a wealthy planter and lumberman. Williams wanted to buy an airplane and Jim had one to sell. Not only did Jim sell him the airplane but taught him to fly-and fly well. During this instruction period Jim also sold himself, and Harry Williams backed his belief in Wedell's ability with two million dollars, an almost unheard of sum for those days. This gave Jimmy a chance to achieve his lifetime ambition, to build an airplane of his own design, to get the speed and safety he wanted and not have to stop every few days to barnstorm for gas and hamburger money. With Harry Williams backing him, the Wedell-Williams Air Service, Inc.

(1928), was organized. Jimmy Wedell was appointed President and told to go ahead and build his dream.

Jimmy built airplanes by eye, as the untrained musician plays by ear, but they flew and they were fast. He wanted to build the fastest, safest fighting and mail planes in the world. At the same time he wanted them safe enough for the average pilot to fly at a top speed of 400 mph plus. Work began with Jimmy drawing some chalk lines on the hanger floor. This roughed out the size and shape of the first Wedell Williams Special. From this Walter Wedell, Charles (Frenchy) Fortune, Eddie Robertson and Jimmy started welding. Periodically, Jim would cock his head and state, "That looks about right for length or span," and not until the racer was finished, was the actual measurement made of the total length or wing span.

This was true, to a great degree, with the construction of all the Wedell-Williams racers. The results of the first project was a low wing, Hisso-powered racer carrying license number NR278V. It would be later twice revamped to become the famous Wedell No. 44.

Late in December of 1929, rebuilding and revamping began on number 44. It was to be entered in the January 1930 Miami Air Races, so time was short and the midnight oil burned freely. As race time approached, it became more evident that the project would not meet the deadline, still work continued. Then late in January (too late for the race), the bullet nosed 180 hp V-8 Hisso-powered racer emerged from the hangar. A tightly cowled V-type engine gave the racer the appearance of the Verville R-3 Speedster of 1924. Its landing gear assembly was set-up for a full speed fairing, from the bottom of the wings to just below the wheel axle. Small pants covered the wheels only and the remainder of the assembly was not faired. The wing span measured 30', length 24'8": the paint job was scarlet and silver and she unofficially timed at 210 mph.

During the year 1930, Wedell-Williams produced three racing aircraft. First the No. 44 NR-278V already mentioned, another model 44 which would become famous as No. 92-NR-536V tin fact during 1930 these two racers participated in several match r aces) and a Cirrus powered job ~ NR-10337) to be entered in the 1930 American Cirrus Derby. They all had something in common. Each took approximately 90 days to build and each was painted scarlet and silver; all parts were scarlet except the wings and horizontal tail surfaces which were silver. Their race numbers were 90, 91 (44), and 92.

The small job was dubbed "WeWill, Jr." and was powered by an inverted four cylinder super-charged hi-drive Cirrus engine rated at 110 hp at 2100 rpm. Wing area of the racer was 120 square feet, gross weight 1440 pounds and top speed estimated at 170 mph. A small, streamlined red spinner covered the prop hub while the landing gear and wheels that had been set up for full speed fairings remained uncovered. Time had not permitted the construction of the streamlined fairings. "WeWill, Jr." was licensed NR-10337 and drew race number 17 for the 5,541 mile, 16 leg cross country race. Twenty-five thousand dollars was the prize money that "WeWill, Jr." would be vying for. The race started in Detroit, east and then south through Texas, across the southern U.S. to California and back to the northern route to Detroit. A tough go for both pilots and planes as every type of terrain and flying condition would be encountered.

During the first legs of the race, Jimmy fought and exchanged first spot with Lee Gelbach in the "Little Rocket," and Lowell Bayles in the "Gee Bee". However, as the race continued it appeared that the Wedell was faster but the "Little Rocket" more dependable. Arriving in Los Angeles and still fighting for first, Jim decided the Cirrus needed a bit of repair He flew "WeWill, Jr." to the Lockheed factory for the engine work, plus installation of wheel fairings, the type that later appeared on Northrop airplanes~. This work was accomplished during the night and Jim and the racer were at the starting line the following morning. He fired the Cirrus up, checked her power and blasted off into the dawn. But not for long. At 100 feet the Cirrus froze and the prop stopped dead. With no altitude to play with, Jim crash landed straight ahead shearing off the new landing gear and damaging both wings. This eliminated "WeWill, Jr." from any thoughts of first spot in the Derby, but work began immediately to salvage what could be from the race. Twenty-four hours later, and with no sleep, Jim took to the air, (less wheel fairings and with repaired wings', in pursuit of the leaders.

Full throttle - all the way to the firewall - the throttle position Jim maintained during the balance of the Derby), "WeWill, Jr." went, but the lost time was too great and Wedell finished eighth, and collected $1,600.00 in prize money.

Later in 1930, "WeWill, Jr." appeared at the Chicago National Air Races. Race number 90 replaced No. 17 and small pants covered only the wheels. During these events Jimmy placed third in the 350 cu. in. free-for-all (140.08 mph) and fifth in the 450 cu. in. free-for-all (132.24 mph).

"WeWill, Jr." did not appear again until 1932, and then with a very new look. Completely rebuilt to vie for lower power class race money, "WeWill, Jr." had its wings clipped about eight inches and its fuselage shortened by four inches. A new streamlined landing gear with wheel pants, a closer cowled engine, and a new propeller spinner all helped the "WeWill, Jr." look like a new airplane. Even a new license number of NR60Y was acquired with a new designation of Model 22 (1/z size 44) was assigned to its design. However, for one reason or another the now two tone blue (dark and light), racer did not appear at the 1932 National Air Races, but did appear at smaller races in the south including New Orleans and Baton Rouge.

Early in 1933, NR60Y appeared with another change. A six cylinder 489 cu. in. Menasco power plant replaced the Cirrus. Test flights were made on April 21, 1933 and the ship was readied for the National Air Races which were to be held during July. The racer retained the two tone blue paint job, but race number 54 replaced 22. Again disaster struck, and again in Los Angeles during the Nationals. A fire on the ground eliminated NR60Y from the 1933 Nationals. All the fabric was burned from the fuselage and the racer was then pushed into the corner of the hangar and its Menasco engine was removed. After the 1933 event the engine was shipped back to Patterson and the balance of the aircraft remained in Los Angeles where it was purchased by Dave Elmendorf.

A second model 22 had been built and the Menasco from NR60Y was placed in this frame. The second model 22 differed from the original in the shape of the fuselage and empennage. Wings and cowl were definitely Wedell, but the aft section had been built by Delgado Trade School of New Orleans and resembled their racers of later years-in fact the empennage and fuselage were almost identical with the "Delgado Maid" and "Flash". Jimmy loaded the airframe and engine on a truck and took off for the International Air Races in Chicago. Arriving at Chicago, Jim assembled the plane and completed the installation of the Menasco from NR60Y. This work was completed the starting day of the races,1 September,1933, and a 15 minute test hop was the only flying Jim had time for. Model 22-No.2 was licensed NR64Y and earned race number 22 on its flanks. Air Race blanks show that

the ship was entered with race number 54, this would indicate that Jim planned to race NR60Y at these races and the fire in Los Angeles necessitated the change of airplanes.

NR64Y participated in only one event. Jim pulled out after the first lap as the engine was not functioning well enough to continue this event or enter any subsequent races. There was no time for engine repair as Jim also had the Model 44 at the races, so 64Y was pushed to the corner of the hangar until the International Air Races were completed. After the race the little racer was disassembled and trucked back to Patterson, Louisiana. Later Jim made one more attempt with it. He reassembled the racer and on 25 February, 1934 flew a 20 minute test hop. Performance of the airplane was not acceptable so the Menasco engine was removed, and the remainder of the racer was donated to Louisiana State University.

NR60Y did not appear again until 1935, this time wearing its original race number 22 and a red and silver paint job. Dave Elmendorf had purchased the ship and was the pilot during the National Air Races. He placed seventh in the Greve Trophy Race and fourth in one of the Greve preliminary heats with a speed of 176.016 mph. This was the last record in NR60Y's race history.

Now back to the other two racers Wedell built in 1930. First, NR-278V (Race No. 91) mentioned earlier. Jimmy entered this racer in the 1930 Los Angeles to Chicago cross country race and was leading until the Hisso broke an oil line forcing him to land in Texas. Wedell finished the trip to Chicago by commercial-transportation, arriving just in time to fly "WeWill Jr." in the first event. Later he returned to Texas, repaired the oil line and engine and flew No. 91 back to Patterson, Louisiana for revamping.

Redesigned, the 1931 version of NR-278V would later become the famous No. 44. A full remodelling job resulted in a 23' fuselage, 26' wing span and a Pratt and Whitney replacing the Hisso. Exceptionally clean lines extended throughout the entire aircraft. A streamlined NACA cowl -so small that faired bulges were needed to allow room for the cylinder arms -housed the 550 hp Wasp Jr. Pratt and Whitney engine. Pants covered the wheels, and the gear itself consisted of two narrow, well faired struts.

Wedell also had a great love for guns, maybe his Mexican experience developed it, nevertheless, he was an expert marksman and this is where the Model 44 and 22 originated. On the side of the Model 44 was painted a pistol, with a printed legend: "Hot as a 44 and Twice as Fast".

In keeping with this pattern, race No. 44 was added to the wings and fuselage, a number the ship would retain throughout its entire race career. Thirty hand rubbed coats of red and gold dope gave the racer a finish that reflected like a mirror and looked elbow deep.

This was the year Wedell racers started to click. Trailing Lowell Bayles in the "Gee Bee," Jimmy and No. 44 finished second in the Thompson Trophy Race with a speed of 227.99 mph. He also placed second in the free-for all at 221.0 mph and third in the 1000 cu. in. event, with a sour engine, at 167.106 mph. After the 1931 Nationals Jimmy did some engine tuning on the ship and turned a speed of 255 mph. He also set a cross country record (Three Flags Race) that started at Ottawa, Canada, went on to Washington, D.C., and thence to Mexico City. Jimmy and No. 44 started out at dawn, streaked to Washington, D. C., refueled and took to the air for Patterson, Louisiana. A quick stop at Patterson for fuel, then into the sunset and Mexico City, all in 11 hours and 59 minutes. This was quite a feat for this era and in doing so Jimmy broke the 12 hours 36 minute record set by Jimmy Doolittle and his Laird "Super Solution".

During the winter months of 1931-1932, Wedell and his crew were busy building and rebuilding racers. He completely revamped No. 44 and in the process shortened the fuselage another two feet. The supercharged Wasp Jr. was retained but a smooth cowl replaced the 1931 bulge. This would indicate that Wedell went to a larger cowl. Perhaps the smaller cowl had given some cooling problems. A new high gloss red and black paint job that would remain on the racer for the balance of its career, reflected the many hours of sanding and polishing.

Along with the remodelling of No. 44, the previously mentioned No. 92 was undergoing revamping. No. 92 would also be a Model 44 with outward appearance very similar to NR-278V. However, the landing gear legs extended from the wings in almost a straight line while No. 44 angled out a bit. In addition to these two, a third racer was being constructed for Roscoe Turner. This, too, was about identical to No.44, except internally. Extra bracing had been placed in the wing and fuselage area, causing the wings to flex less than in the other racers. Licensed NR-54Y, it had a very short career as it crashed on the third test flight.

Jim had taken the racer aloft for the test, to check its performance at altitude and all had appeared normal. Then came the ultimate test, a flight virtually at ground level with wide-open throttle. He would try for 300 mph, starting in a shallow dive then levelling off to streak across the field.

Flying so low he seemed barely to clear the tops of the standing sugar cane in the fields adjacent to the airport Jimmy-seated on some 30 pounds of iron to make up for the difference between his weight and Col. Turner's- came roaring toward the airport. Just as he reached the edge of the airport, a wing flutter developed causing a main wing flying wire to snap. At this point the left wing seemed to explode and collapsed. Jimmy literally rode the engine to a safe altitude at which point he bailed out

just as the racer disintegrated. His parachute opened and he landed safely minus one shoe that never was found.

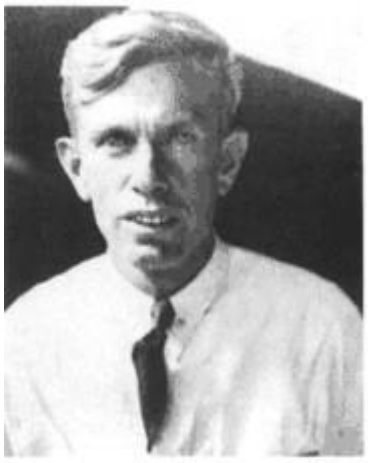
The remainder of the plane crashed nearby, leaving only a cupful of jewelled bearings from the instrument panel as salvage material. Reason for the crash was the rigidity of the wings causing the left one to snap off instead of flexing.

Gilmore Oil Company had sponsored the building of this racer for Turner, so construction of another ship started immediately. This was completed in time for the National Air Races and 1932 proved to be a banner year for the three big Wedell-Williams racers. They chalked up two firsts, five seconds, three thirds and two fourths. These included a first, second and third in the Bendix Race, a second, third and fourth in both the Thompson Trophy Race and the Shell Speed Dashes. Yes, Jimmy had his racers really cleaned up.

Flying his own No. 44 Wedell placed second in the Bendix (232 mph), Thompson (242.50 mph), Shell Speed Dashes (277.06) and 1000 cubic-inch event 202.74 mph).

In 1933 Wedell was back at the Nationals with his fast No. 44. He had replaced the fabric around the cockpit area with aluminium as he felt that the fabric in this area was a source of drag. He lost no time letting the other race pilots know that he was after the money.

During the off season Jimmy made the engine and cowl installation more flexible and it required only six hours to change front the Wasp Jr. to the Wasp Sr. Then, on the 24th of June 1934, Jimmy Wedell was killed in an air crash. The crash occurred while flying his Moth aircraft and giving Frank Sneering a student pilot from Mobile, Alabama, instructions. The aviation society had lost a great member of their team, one who had given much of himself and still had so much more to offer. He took to the grave with him many advancements and designs but many others that he introduced into aviation live on. He established many records that are not listed herein and placed his name in racing history where it lives forever.



Douglas Davis (1929 winner of the Thompson Cup Race was picked as pilot for the famous No. 44 during the 1934 Nationals. The engine change was used at the Nationals, so the racers No. 44 and No. 45) appeared both with a bulge cowl and smooth cowl. Davis pushed the black and red Wasp Jr. powered racer to first spot in the Bendix, beating out Wedell's last design, No. 45. His speed for the Bendix was 216.24 mph. He also won the first spot in the 1000 cubic-inch race with a speed of 220.95 mph and turned in a speed of 246 mph in the Shell Speed Dash. The Wasp Jr. was then replaced by the Wasp Sr. out of No. 45) and the smooth cowl was replaced by the bulge cowl also out of 45.

With this engine, Davis flew over the Shell course at 306.216 mph. One lap was turned at a speed of 325 mph. This speed picked up the first spot in the 1934 Shell Speed Dashes. Turner placed second and Johnny Worthen placed third and fourth flying the Wedell 45 and 92. Before the Thompson, Davis complained about the shortness of the course and also not being familiar with the position of the pylons. He almost withdrew from the race. In fact, he was supposed to have flown this ship in the 1932 Thompson but his wife talked him out of it. However, this time she consented to let him fly the race but refused to watch it. Doug and the black and red piece of dynamite were first off the ground and he poured on the coal to increase his lead. Going into the eighth lap he was leading the pack with a speed of 253 mph and still pouring it on. On the next pylon, not wanting to be disqualified by cutting too short, he pulled the No. 44 into a very tight turn to re circle. The little ship loaded to the extreme with "G's" shuddered and went into a high speed stall, snapped into a spin and plunged to the ground. Davis was killed instantly. Again, another great in aviation was lost but not before he contributed much to the thing he loved most.

Of the three original racers built by Jimmy Wedell in 1930, the one not covered as yet is NR-536V or No. 92. Nicknamed "WeWinc," No. 92 had been built as a two place sport plane with the possibility of developing it into a fast mail plane. It also was a low wing job with the same type of wheel pants that were originally fitted to the Cirrus and No. 44. Powerplant for the 1930 version of "WeWinc" was a Townsend ring cowled 225 hp Wright J6-7 765 cu. in.) engine. Its wing span was 30', length 22' and it carried the Wedell red and silver paint job. During the Nationals the front pit was covered, and full (Northrup type) skirts covered the entire landing gear assembly. With 92 as a racer number and Errett Williams the pilot "WeWinc" placed second in the 1000 cu. in. event (159.07 mph), second in the 800 cu. in. (161.73 mph) and sneaked in fourth in an additional 1000 cu. in. race (150.75 mph). Speeds for the winners of these events were 162.62 and 162.43 mph, indicating that Errett was always in contention. "WeWinc" was entered in the Thompson Trophy Race but was forced out by engine trouble on the eighth lap.

"Miss New Orleans" was back at the Nationals in 1933, with no changes except the pilot and a slight change in paint design. Jimmy Hazilip had retired from the race game, so Lee Gehlbach, who flew the "Gee Bee" R-2 in the '32 races and the Commadaire "Little Rocket" to victory in the 1930 Cirrus Derby, took over the controls of No. 92. During the Bendix, Lee was running short of fuel. He was east of Indianapolis but felt he could make it. Then with the airport in sight, the Pratt-Whitney quit and Lee started a glide to the field. Glide angle is not very good on racing aircraft and Lee ended up one mile short, in a corn field. Damage was slight and with minor repairs and fuel, the race was continued on to Los Angeles, but not in time to place. Later Gehlbach flew the ship to second place in the Thompson 224.95 mph), second in the 1000 cu. in. race at 192.93 mph) and slipped to third in the Shell Dash (251.93). Mae Hazilip again tried her luck and skill in the woman's race. This time she won with a speed of 168.22 mph.

Two new Wedell- Williams race pilots appeared in 1934. Walter Williams Jimmy's brother) and John Worthen (an associate of the Wedell-Williams Air Service, Inc.) divided their pilot time between No. 92 and No. 45. Walter really hated racing but after the death of Jim, figured he should attempt to take over where Jim had left off. He had idolized Jim and his racing. After Jim's death, Walter became more and more against flying but continued in the manner he felt Jim would have wanted. Walter flew No. 92 to second place in the 1000 cu. in. event, (219.50 mph). Walter placed third in the Thompson (208.38) and fourth in the Shell Dash `248.91 mph) with the same racer.

Old No. 92 did not appear in the 1935 or '36 National Air Races. In 1936 this ship was bought by Jack Wright of Utica, New York. Wright made no changes on the racer except to paint the name "Utican" on the cowl. He picked Art Davis as the pilot for the ship and entered it in the 1937 National Air Races. Unfortunately, Davis nosed the racer over on the way to the starting point of the Bendix and was unable to get the ship repaired in time for the balance of the '37 races.

During 1938 the New York State Aviation School reconditioned the ship for the races. The paint job was all white and a new constant-speed propeller was fitted to the nose. A new cockpit and windshield also changed the looks of old No. 92. But trouble again hit and the "Utican" and Lee Gehlbach, who once again sat in the cockpit, was forced out of the Bendix.

The gallant old racer that had participated in the Nationals since 1930 was bought by Woody Edmondson ~famous Monocoupe stunt pilot) but the coming of World War II stopped any modifications planned for the racer and during these war years she became the victim of salvage and supplied tubing and parts to keep other aircraft flying.

Roscoe Turner's "Gilmore Special" was the third Model 44 present at the 1932 races. This was NR61Y the second built for Turner after his first NR54Y crashed during tests. Painted a beautiful bronze gold and trimmed in red with the Gilmore Lion and race number 121 displayed on the side of the fuselage, the racer presented a picture of speed for its Gilmore Oil Company sponsor. Colonel Turner placed third in the Bendix (226 mph), Thompson 233 mph) and Shell Dash (266.67 mph) each time following No. 44 across the finish line. Later the same year Turner lost his sponsor but being quite a promoter he acquired movie stars Miriam Hopkins, Bebe Daniels, Constance Bennett, and Carol Lombard as backers.

Not happy with third spots, Turner showed up at the 1933 Nationals with a new Wasp Sr. engine in his racer. As mentioned, the Gilmore people no longer sponsored the ship, but the Gilmore paint job still decorated the wings while the fuselage had a new paint job and on the side in bold letters was painted "20th Century Pictures-The Bowery". A new race number 2, replaced 121 and the engine cowl for the Wasp Sr. was burnished metal. The 1933 races netted Turner some firsts but also threw him a curve when he was disqualified from winning the Thompson for cutting a pylon. He did circle

the pylon, but not on the same lap as the rules called for. He had led the Thompson with a speed of 241.03 mph but when disqualified the first spot went to Jimmy Wedell with a speed of 237.05 mph. Roscoe, however, did pick up a first in the Bendix (214.78 mph) and a first in the Shell Dashes at 280.25 mph.

During the years 1932 and 1933, Turner set many inter-city and coast to coast records selling aviation and giving his sponsors a real show for their money. Late in 1933, Chicago played host to the International Air Races and Roscoe again settled for second behind Wedell. Jim had exchanged his Wasp Jr. for a Wasp Sr. and outran Turner by 15 miles an hour. Turner's speed for the Shell Dash was 289.9 mph and Jim's 305.33 mph. The only change Roscoe had made in his ship was the removing of the "20th Century Pictures" and replacing it with "Ring Free Special". The racer was entered in the International Races with race number 17, but it is doubtful if that number was ever painted on it.

After the trimming he had taken from No. 44, Turner removed the Wasp Sr. 1344 cu. in. engine and replaced it with a 1690 cu. in. 1000 hp Hornet engine. A smooth cowl was used at first but later, because of the large frontal area, changed to a tighter fitting smaller cowl with fairing bumps for the rocker arms. The racer sported a new race number 57 for Roscoe's latest sponsor, the H. J. Heinz Company and their 57 varieties of canned foods. Turner won the Thompson Trophy Race with a speed of 248.13 mph. Davis had been leading at the time of his crash with a speed of 253 mph. Turner followed Davis in the Shell Speed Dash with speeds of 306.215 mph and 295.47 mph for the first and second places.

Roscoe made a few minor changes on the racer before the 1935 National Air Races. He had gone to the largest possible engine, so could do nothing more in that line. He was no longer sponsored by the Heinz Co. Number 57 was no longer in a red disc (Heinz Trade Mark), but merely painted as a normal race number: In the Bendix of 1935 Turner was beaten out by Benny Howard and his "Mr. Mulligan". The time difference being a mere 23.5 seconds.

Roscoe was in the lead during the race and going away when his engine faltered and smoke filled the cockpit; a trail of thick black smoke belched from under the cowl and streamed behind the gold racer. Roscoe limbed for altitude, the item he would need for a bailout or to pick a piece of real estate to set the hot little racer on. He could only hope it wasn't on fire and that it might not blow at any minute. He did get enough altitude to nurse the racer over the airport fence, but only by inches. Immediately after crossing the fence she fell out from under him and bounced in for a very hard landing, but his aircraft was saved. Once again fate had dealt him a losing hand in the Thompson race. Investigation revealed that the engine had thrown a supercharger blade causing loss of oil and an engine seizure.

It was hard luck again in 1936 as Roscoe encountered engine stoppage while over very rough terrain in New Mexico. He was enroute to New York, the starting point of the Bendix when the engine faltered. With no desirable place to land, Roscoe picked the smoothest of the undesirable. Hitting down very hard and in deep ruts, the ship now wearing race No. 67, dug its landing gear into the earth, the prop and engine hit the ground and the fuselage broke in two just aft of the cockpit. Roscoe was unhurt but the plane was beyond quick repair and Turner was forced to observe the National Air Races as a spectator. He shipped the racer to Matty Laird in Chicago for rebuilding and it came out looking no different than old No. 57, except the fuselage was shortened a few inches. Roscoe had picked up a new sponsor and the ship was now known as "Ring Free Comet". A bright comet and race No. 25 was added to the sides of the gold fuselage. Other than these, the racer appeared unchanged. Joe Mackey was now the pilot as Roscoe had moved into his new Turner Laird Brown Racer. Mackey didn't have much better luck than Roscoe had in 1935 and 1936. He was forced out of

the Bendix and after qualifying second highest in the Thompson time trials with a speed of 247.03 mph he was forced out on the 17th lap.

In 1938, the "Ring Free Comet" was rolled out of the hangar for the races. It had been stored all year and received nothing more than a rubdown before the races. Joe Mackey again flew the racer. This time he placed fifth in the Thompson with a speed of 249.63 mph.

1939 was a duplication of 1938. Old "Comet" was rolled out for the National Air Races, dusted off and fired up. Mackey pushed No. 25 to sixth spot in~ the Thompson Trophy Race, the only event entered, with a speed of 232.93 mph. This was the racer's seventh season and the ship was getting outclassed. The war years, perhaps, hastened the retirement of No. 25 and it now sits in the Thompson Museum at Cleveland, Ohio.

Jimmy's last design prior to his death was the Model 45, NR62Y. This ship was built in 1933 and tested by Jim in June. Differing from the other Wedell Williams racers, No. 45 had full cantilever wings and a retractable landing gear. Its design was bought by the Army Air Service (design only) and designated the XP-34. Model 45 was powered with the Wasp Sr. out of No. 44 and the two engines were interchangeable. Her paint job was red with a black cowl and gear panels, and as expected, she carried race No. 45 on her fuselage and wings. First unveiled in February, 1934 at the Pan American Air Races, New Orleans, with Jimmy Wedell at the controls, she turned a speed of 264.703 mph. Wedell's untimely death prevented him from getting the bugs worked out of the Model 45. However at the 1934 National Air Races, John Worthen flew the ship to second place in the Bendix race. He averaged 203.13 miles an hour and could have taken first had he not overshot Cleveland and landed at Erie. In the Shell Speed Dashes, Worthen turned 302.36 mph with the Wasp Sr. and 292.14 with the Wasp Jr. After the crash of No. 44, it was decided not to fly back to Patterson with the Wasp Jr. engine and it was shipped back and later donated to Louisiana State University.

Jimmy Wedell had designed and was in the process of building a long distance racer for the MacRobertson Race, London, England, to Melbourne, Australia. This project ended with Wedell's death. A year later, his brother, Walter, died in an-unexplained air crash, also Harry Williams and Red Worthen. So ended the wonderful years of the Wedell-Williams Air Service and its racing airplane.

During the years Wedell-Williams chalked up many victories in smaller races not contained herein. Their records were most impressive. At the Nationals alone, 1931 to 1935, they finished the Thompson with two firsts, three seconds and two thirds; the Bendix with three firsts, three seconds and one third; the Shell Dashes with three firsts, five seconds and two thirds. They did this using less horsepower than their big competitors.

"Gilmore - Red Lion"

In 1932, Roscoe Turner, with the financial backing of the Gilmore Oil Company, commissioned the Wedell Williams Air Service Corporation to construct a racing airplane. The airplane was to be the third in a series of almost identical ships known as the Wedell Williams Model 44s. The first version of Turner's Wedell broke apart in mid-air during a test flight, but the airplane's designer and test pilot, Jimmy Wedell, was able to bail out. The second version was strengthened and delivered to Turner during the summer of 1932.

Roscoe Turner with his Wedell-Williams "Gilmore - Red Lion" racer at the 1932 Cleveland National Air Races.

Sporting a colourful red and cream paint scheme, Turner flew his Wedell to third place in both the 1932 Bendix and Thompson trophy races. In 1933, Turner purchased the airplane from the Gilmore Oil Company and replaced its 550 hp Pratt & Whitney Wasp Jr. engine with a more powerful 800 hp Pratt & Whitney Wasp Sr. The new engine won him the Bendix trophy in 1933, but he was disqualified from winning the Thompson Trophy Race because he flew inside one of the race pylons. Still not satisfied with the power of his Wedell, Turner once again upgraded his engine to a 1000 hp Pratt & Whitney Hornet and went on to win the 1934 Thompson Trophy Race.

In 1935 Turner in the Wedell finished a close second in the Bendix race but mechanical problems forced him out of that year's Thompson Trophy Race. Turner's bad luck continued when he crash landed on his way to the start of the 1937 Bendix race. The Wedell was rebuilt by Matty Laird at his Chicago factory in only ninety days. But by the time it was ready to race again, Turner had already taken delivery of a new more powerful racer, the LTR-14. The job of flying the Wedell in the 1937-39 National Air Races was then given to Joe Mackey, a long time associate of Roscoe Turner. Mackey was never able to finish better than fifth place with the Wedell.

After the 1939 National Air Races, the now obsolete racer was stored in a Cleveland Airport Hanger. In 1947, Frederick Crawford acquired the former champion for the Thompson Products Auto Album and Aviation Museum in exchange for paying off Turner's substantial back storage bills.

The aircraft on display was restored to its appearance at the 1939 National Air Races.

Type:	Wedell Williams Model 44
Powerplant:	1020 hp Pratt & Whitney 1690 Hornet
Performance:	Maximum speed 295.47 mph
Weights:	2492 lb. empty; 3892 lb. gross

Dimensions:	Span 26 ft. 2 in.; Length 21 ft. 3 in.

Winnie Mae Lockheed Vega

The *Winnie Mae, a* special Lockheed Model 5C Vega flown by famed aviator Wiley Post, completed two around-the-world record flights and a series of special high-altitude substratospheric research flights. It was named for the daughter of its original owner, F. C. Hall, who hired Post to pilot the plane, which had been purchased in June 1930.

With the consent of his employer, Post entered the *Winnie Mae* in the National Air Races and piloted the plane to the first of its records, now inscribed on the side of its fuselage: 'Los Angeles to Chicago 9 hrs. 9 mm. 4 sec. Aug. 27, 1930.'

On June 23, 1931, Post, accompanied by Harold Gatty as navigator, took off from New York to make a world circuit in record time. The first stop was Harbour Grace, Newfoundland. From there, the fourteen-stop course included England, Germany, Russia, Siberia, Alaska, Canada, thence to Cleveland, and finally to New York on July 1, 1931. The circuit was completed in 8 days, 15 hours, and 51 minutes. Halls admiration for his pilot manifested itself in the gift of the *Winnie Mae* to Post.

Wiley Post spent the following year exhibiting the plane and conducting various flight tests. The airplane was groomed with an overhaul of the engine, and a radio compass and an auto pilot were installed. Both these instruments were at the time in their final stages of development by the Army and Sperry Gyroscope Company.

On July 15, 1933, Post left New York. Closely following his former route but making only eleven stops, he made a 15,596-mile circuit of the earth in 7 days, 18 hours, and 49 minutes.

Post next modified the *Winnie Mae* for long-distance, high-altitude operation. He recognized the need to develop some means of enabling the pilot to operate in a cabin atmosphere of greater density than the outside atmospheric environment. Because of its design, the *Winnie Mae* could not be equipped with a pressure cabin. Post therefore asked the B. F. Goodrich Company to assist him in developing

a full pressure suit for the pilot. Post hoped that by equipping the plane with an engine supercharger and a special jettisonable landing gear, and himself with a pressure suit, he could cruise for long distances at high altitude in the jetstream. On March 15, 1935, Post flew from Burbank, California, to Cleveland, Ohio, a distance of 2,035 miles, in 7 hours, 19 minutes. At times, the *Winnie Mae* attained a ground speed of 340 mph, indicating that the airplane was indeed operating in the jetstream.

Wiley Post died shortly afterward in the crash of a hybrid Lockheed Orion-Sirius floatplane near Point Barrow, Alaska, on August 15, 1935. His companion, humorist Will Rogers, also perished in the accident. The Smithsonian Institution acquired the *Winnie Mae* from Mrs. Post in 1936.

During its high-altitude flight research, the *Winnie Mae* made use of a special tubular steel landing gear developed by Lockheed engineers Clarence L. Kelly' Johnson and James Gerschler. It was released after takeoff by the pilot using a cockpit lever, thus reducing the total drag of the plane and eliminating its weight. The *Winnie Mae* would then continue on its flight and land on a special metal-covered spruce landing skid glued to the fuselage. During these flights, Post wore a special pressure suit, the world's first practical pressure suit and an important step on the road to space. The suit was the third type developed by Post and Russell S. Colley of B. F. Goodrich Company.

It consisted of three layers: long underwear. an inner black rubber air pressure bladder, and an outer cloth contoured suit. A special pressure helmet was then bolted on the suit. It had a removable faceplate that Post could seal when he reached a height of 17,000 feet. The helmet had a special breathing oxygen system and could accommodate earphones and a throat microphone. The suit could withstand an internal pressure of 7 psi. Bandolera-type cords prevented the helmet from rising as the suit was pressurized. A liquid oxygen container, consisting of a double-walled vacuum bottle, utilized the natural "boil off" tendencies of supercold liquid oxygen to furnish gaseous oxygen for suit pressurization and breathing purposes. This early full pressure suit is the direct ancestor of full pressure suits used on the X-15 research airplane and manned space voyages. The *Winnie Mae,* its special jettisonable landing gear, and Post's pressure suit are in the collection of the National Air and Space Museum.

Wittman D-12 Bonzo

Sylvester Wittman (1904-1995), known as "Witt" or "Steve" to his friends, was one of the greatest-possibly the greatest-pylon (closed-course) air race pilot in history. Between 1926 and 1989, he competed in and won more air races than anyone else. He built some of the world's most successful race airplanes. He designed and patented the spring landing gear later used in Cessna airplanes. He and Bill Brennand effectively invented Formula Vee (Volkswagen-powered) air racing. The airport at Oshkosh, Wisconsin, site of the world's largest aviation convention, bears his name.

Wittman learned to fly in 1924, in a surplus Standard J-1 biplane he bought with a friend. He entered his first air race two years later in Milwaukee, and he first competed in the National Air Races in Florida in 1928. In 1931, he moved to Oshkosh, Wisconsin to operate the Oshkosh airport. There, he designed and built "Chief Oshkosh," his first homebuilt racer. With engines ranging from 90 to 150 horsepower, Chief Oshkosh won many races between 1931 and 1937 and placed "in the money" in many others, often competing against much more powerful aircraft. In 1937 Wittman piloted the Chief to a world record for its class, of 238.22 mph.

In 1934, Wittman set his sights on the famed Thompson Trophy Race, a pylon race for aircraft of unlimited size and power. Without any formal training in aeronautics, Witt designed and built Bonzo, specifically for the Thompson Trophy Race. The design was dictated by the engine and Wittman's choice of engine was dictated by his lack of funds. He chose an obsolete Curtiss D-12 engine, the same type as was used in Curtiss-Schneider Trophy Race winners in the mid-1920s. Wittman's race plane designs emphasized light weight rather than sophisticated streamlining. Bonzo's fuselage was no larger than it had to be to hold the big V-12 engine, giving it an odd, angular look that the race press called "a flying barn door." The wings, built of wood, did not have the strong, heavy plywood skins typical of race planes of the day. Instead, Wittman spaced the wing ribs twice as close together as in normal wing construction. With a doped fabric skin, the extra ribs gave the wings the strength needed at race speeds.

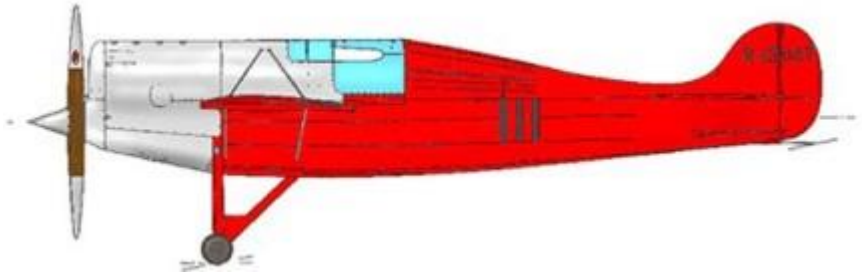
In its first Thompson Trophy Race-1935-Bonzo finished second behind Harold Neumann flying "Mr. Mulligan." Flying Bonzo cross-country to the 1936 National Air Races in Los Angeles, Wittman landed in Cheyenne, Wyoming, where an engine backfire set Bonzo on fire. The fire was quickly put out but Bonzo was damaged too much to compete that year. A year later, at the 1937 Thompson Trophy Race, Wittman flew a rebuilt Bonzo to the fastest qualifying time-more than 275 miles per hour. He led the field for 18 of the race's 20 laps, until a rough engine forced him to throttle back and finish in fifth place. In the 1938 National Air Races, Wittman and Bonzo placed third and in 1939, in the last Thompson race before WW II, Wittman and Bonzo placed fifth. Throughout its racing career, Bonzo faced competitors with more horsepower and more financial backing, yet Bonzo remained a serious and respected adversary among unlimited pylon racers. In its final configuration, Bonzo could achieve 325 miles per hour-faster than the fastest U.S. military fighter planes of the day-on just 485 horsepower.

Steve Wittman and Bonzo

When unlimited air racing resumed after WW II, it was dominated by modified WW II fighter aircraft. The days of the homebuilt racer were gone and Bonzo retired. Wittman continued racing and winning in a variety of airplanes until his retirement in 1989 at age 85.

Wing Span	17 ft. 2 in.
Length	22 ft. 2 in.
Seats	1
Empty Weight	1,650 lbs.
Gross Weight	2,470 lbs.
Engine	Curtiss D-12 Challenger, 485 hp
Top Speed	325 mph
Cruise Speed	250 mph
Stall Speed	85 mph

Wittman Chief Oshkosh



Chief Oshkosh was Wittman's first homebuilt racer. The Chief was designed for closed course competition where it often held it's own against aircraft equiped with much larger engines.

Construction started in April 1931 and was completed in time to race at the '31 National Air Races in Cleveland. At it's premier race 'Chief Oshkosh' developed aileron flutter at high sdpeeds and only finished two events after dropping out of several others. After some post Cleveland redesign, Wittman took 'Chief Oshkosh' to the New York Races where he won 5 firsts in the 350 cubic inch races and took second in the free for all where he was bested only by Frank Hawks in a 450 hp Travel Air 'Mystery Ship.'

In 1932 Wittman beat the Howard Pete in a race. In 1933 he won the 350 cubic inch class at the National Air Races. Wittman placed 'in the money' in many races while flying 'Chief Oshkosh'. In 1937 Wittman/Chief set a new 'in class' world record of 238.22 mph over a 100 km course. Due to constant improvement Chief had an enviable record until it was wrecked in 1938. The remains were shoved in the corner of a hanger until 1946 when the fuselage and a spare set of wings were used along with a C-65 engine to create 'Buster'. Buster can be seen at the National Air and Space Museum while a replica which was made from Chief's original wings and gear can be seen at the International Sport Aviating Museum in Lakeland, Florida.

When unlimited air racing resumed after WW II, it was dominated by modified WW II fighter aircraft. The days of the homebuilt racer were gone and Bonzo retired. Wittman continued racing and winning in a variety of airplanes until his retirement in 1989 at age 85.

1931

Length: 18 ft 2 in
Wingspan: 18 ft 10 in
Wing Area: 68 sq ft
Powerplant: American Cirrus (90 hp)
Top Pylon Speed: 150.27 mph

1932

Powerplant: Hermes Cirrus (110 hp)
Top Pylon Speed: 166.9 mph

1934

Length: 18 ft 4 in
Wingspan: 15 ft 5 in

Wing Area: 52 sq ft
Top Pylon Speed: 186.6 mph

1936

Length: 14 ft 6 in
Wingspan: 13 ft 0 in
Wing Area: 43 sq ft
Powerplant: Menasco 4 cyl (150 hp)
Top Pylon Speed: 215.079 mph
Multiple leaf gear landing gear fitted.

1937

Wingspan: 12 ft 5 in
Top Pylon Speed: 245.33 mph

Wright F-2W

Wright F-2W

For the 1923 Pulitzer Race Wright wanted to smash the supremacy of Curtiss in the field of racing aircraft, so Wright designed the TX with the same and clean lines as the R-6 racers of Curtiss. The small wooden biplane had a monocoque structure and the Wright T-3 racing engine had a 200 hp advantage over the Curtiss engines. Second Lieutenant Lawson H. “Sandy” Sanderson took the TX A-6743 for its maiden flight from Curtiss Field, Garden City, NY, on 27 August 1923.

The biplane had a fuel capacity of 31.7 US gallons (120 l), barely the needed quantity for the 124 ml (200 km) race. Wing surface radiators (hence the dark wing area) cooled the engine that drove a two-blade wooden propeller. During construction the second TX (A-6744) had the fuel quantity increased to 60 US gallons (227 l) and a Hamilton three-blade duralumin propeller was fitted, later this sort of propeller was also fitted to the first aircraft.

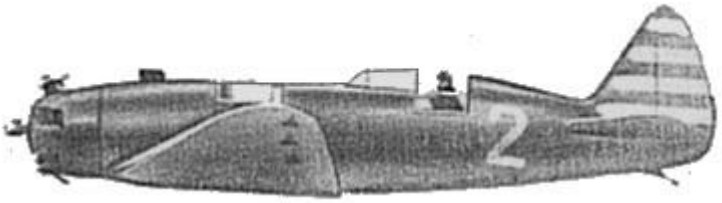
On 16 September 1923 the TX flown by Sanderson established an average of 247.7 mph (398.5 kmh), very promising for the Pulitzer Race. The TX was redesignated F2W-1 and on 6 October 1923 Sanderson flew in his red Number 8 (A-6743) the first and fastest lap at 240.3 mph (386.6 kmh) and

finished after four laps at an average of 230.06 mph (370.17 kmh). Running out of fuel Sanderson crash-landed the aircraft and it was completely wrecked, but “Sandy” escaped serious injuries.

Lieutenant Steve Calloway flew Number 7 (A-6744) to an averaged speed of 230 mph (370 kmh) precisely, but the Curtiss R2C made an average of 243.68 mph (392.08 kmh), so again Wright was not able to defeat Curtiss.

A-6744 was extensively modified by Wright and fitted with floats it turned into a seaplane racer. In this form the aircraft was known as the F2W-2, but not for long as early in 1924 it crashed during testing and was damaged beyond repair.

YAK AIR - 12



The YAK AIR-12 2 -seat racer was built for long range competition. The main landing gear was retractable. The pilot's cockpit was located well after the wing and enclosed by a narrow canopy. The passenger cabin, (above the wing), was flush with the fuselage and could be used for extra fuel tanks. The wing had a swept leading edge and a straight trailing edge. The AIR-12 rolled out in July 1936, and participated in aircraft competitions in same year. On September 21 Yu.I.Piontkovskij during the factory trials schedule performed a non-stop flight Moscow - Sevastopol - Kharkov. 2000km were covered in 10h45min. AIR-12 was re-engined with more powerful M-11E engine. With a female crew, V.S.Grizodubova, as a pilot and navigator M.M.Raskova it flew 1444km from Moscow to Aktubinsk, setting another record on October 24, 1936.

Technical data

Type	AIR-12
Function	Racer record breaker
Year	1936
Crew	1 or 2
Engines	1*100*hp* M-11 later 1*150*hp* M-11E
Length	7.17*m*
Wingspan	11.0*m*
Wing area	15.6m^2
Empty weight	558*kg*
Loaded weight	1204*kg*
Wing load	77.2kg/m^2

Power load	12.0*kg/hp*
Maximum Speed	235*km/h*
Landing Speed	93*km/h*
Takeoff Run	220*m*
Range	2000*km*
Flight Endurance	10*h*45*min*
Payload	
Fuel	430+40*kg*