



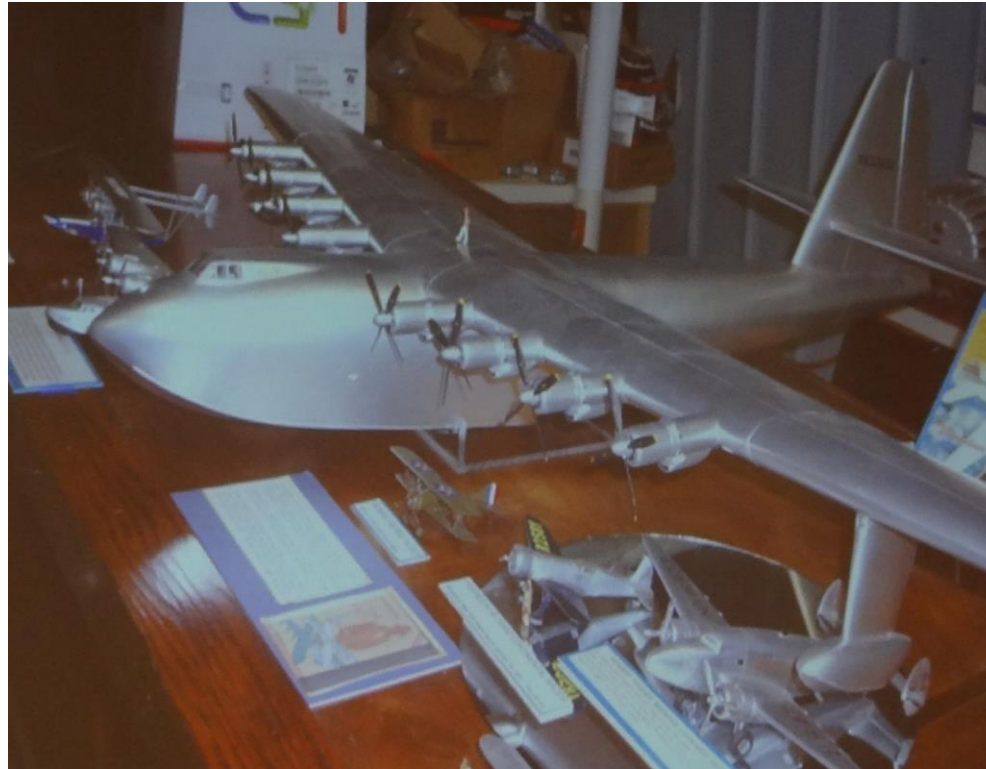
THE STYRENE SHEET TWO

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A SEEMING HERCULEAN TASK – TWICE RENDERED



Welcome . IN THIS ISSUE – *Modeler & Historian Jim Lund Allows For A Second Take On This Model ...*

(Feature Article Begins on Page 3)

“ A HUMBLD EDITOR THANKS SOMEONE WHO TRULY MANAGES TO DO RIGHT BY THE ONE TRUE RULE OF MODELLING ”

There he is, calmly practicing “social distancing, El Lundo Style” without complaint or drama, just doing what must be to carry on in these interesting times



Mr Warren James Lund is unflappable, ever the gent and accomplished Photographer/Historian And Modeler. Not to discount or miss chance to mention he truly has a corner on “History of The Martini” as well.

Jim is probably more on OK bandwidth than this Editor could ever hope to be with immediate events at hand, but then he managed to have one hell of a life and wife in his passage so far here.

Seen here practicing the sharing of model portion of aforesaid, in part, as he noted at our last meeting in assembled person, no one institution could handle his finished 1/72nd scale museum...

Re:current events? Jim is patient more than I for time when

Governor Nuisance and the Santa Clara Health Director do finally release us to be able to visit him at his home to appreciate the last of his museum models before disposition. -mickb fini

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- 3) ANOTHER LOOK IF YOU WILL: THE UPDATED AND COMPLETE TALE of Mr. Hughes's and Mr. Lund's Hercules (runs to 15)
- 16) AND FURTHER MORE: PICTURESQUELY ADDING TO THE TALE of Mr. Hughes's and Mr. Lund's Hercules (runs to 20)

Chapter 5: Scratch Building Big, The H-4 Hercules

Text & Photos: W.J. Lund

INTRODUCTION – PROLOGUE from Editor

A bit of prehistory – In 2017, Jim offered me an article base for this model. Some which he had originally submitted to the club in 2005 and did see published in a 2006 Styrene Sheet, in a poor fashion. When I reviewed the article as published, having dimly recalled reading back then, now had personally archived in my print collection, I concurred with Jim. That another Editor, working with his resubmitted material alongside reviewing a less than successful edit of original article, warranted a second try. This for making sure his work was seen as he intended and should be respected.

When you finish this, head to my Editor's Archive tab at mickbmodeler.com, find 2006 May Original Styrene Sheet, read first version, compare. One of the reasons I developed "second Sheet" in this format was to better accomplish certain result. But original format didn't create that edit butchery...

BEGIN WITH END RESULT OF BUILDING BIG - The Hughes HK-1 renamed H-4, thus leaving Henry Kaiser out of the deal.



If only Harrison Ford's Indiana Jones could look this good -fact is greater than fiction- The great Chinese philosopher Confucius has said: "One picture is worth a thousand words". A pensive Howard Hughes contemplates his pledge "I have stated that if it fails, I will leave the country, and I mean it", while sitting at the controls of his creation. The burden of proof was now upon him. All of the unknowns of 200 tons of aircraft were now in his hands. Howard once more showed that he was the man to do it.

This isn't Hollywood, it's just up the road, at Long Beach.

Here we see Howard Hughes, not Leonardo DiCaprio.

Howard Hughes, who came within an inch of death in a fiery crash in a residential neighborhood in Los Angeles, just the year before. He was just about to make some taxiing tests, and "get the feeling of his monstrous creation".

Check out the controls, rev up the engines, do all the things a crew of test pilots and flight engineers do with a new flying machine. However, Hughes was none of the above.

He could never be bothered by all of that schooling. He possessed instincts and the money that put him into this position.

He hired qualified engineers to take his ideas and designs, and manufacture them. Howard himself always did the testing. There were many people on board. That was OK, because these were taxi runs and such. There were chase boats filming the tests, for analysis after the fact.

*A photo from Page 33 of Jim Lund's book "The Aircraft of Howard Hughes" El-Lundo Publications, 2013.

The tests had already shown that the hydraulic controls were too slow, and would have to be replaced by electrical ones. On the last run of the day, Hughes ordered 15 degrees of flap (take off position). Called for full power and they were off and running. The goal of this test was to get up on the “step”.

Then the unthinkable happened: The damned thing popped up off the water and in a flash, became airborne, and was 40 feet in the air.

The combination of all that power with the flaps in that position, created a “ground effect” that hurled all of that tonnage into the air. **DISASTER!**

An eight engined, 200 ton monster in the air at over 100 miles per hour.

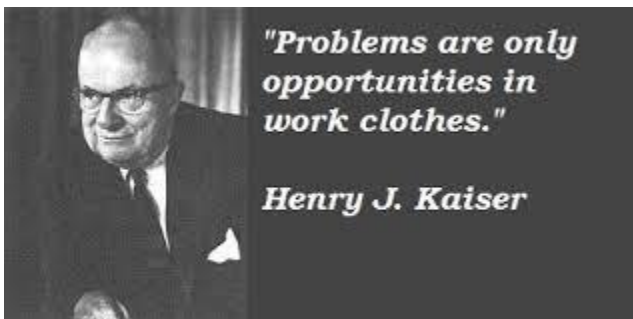
Hughes knew that the ailerons were too slow to correct the path of this monster. He immediately slammed the throttles down ...this cut the power to the hydraulics.

He then applied a little more throttle to restore control.

In the meantime, the behemoth was settling down onto the sea. Kerplunk ... and then salvation.

As Howard Hughes taxied back to the pier, he came to the realization that this event had ended with all aboard safe, and the aircraft intact.

Also, the entire “Flight” had been captured on film. A nightmare was transformed into a dream flight. We end the beginning here for now, read on.



WHERE IT ALL BEGAN - BUILDING BIG - A MAN ON A MISSION

An ambitious young New Yorker born of German immigrants, follows the advice of newspaper man Horace Greeley, who called out “Go west, young man”. Kaiser’s greatest achievement was the Richmond shipyards of WW-2. He created a system of shipbuilding, enabling him to set a record to build an ocean going heavy cargo ship in 4 days and 15 hours.

These were the famous “ Liberty Ships”.

In 1942, the Nazi U-Boats known as the “Wolf Pack’ were sinking them almost as fast as Kaiser could build them. Kaiser envisioned a giant aircraft that could fly the Atlantic and avoid the Wolf Pack.

Kaiser, now a West Coast mogul, went first to Boeing in Seattle, where he was told his idea was unfeasible. He then went south to the Los Angeles area, where Donald Douglas and Lockheed said the same.

When Kaiser approached Howard Hughes, he found a sympathizer. Howard Hughes was a patriot. His aircraft never gained a government contract.

Also, he had pissed off Donald Douglas when he refused to pay the full amount of his invoice from Douglas for work on one of his airplanes. As a matter of fact, Douglas stated that he would never do business with Hughes ever again.

Hughes told Kaiser that he could build an aircraft that would do the job. An aerial giant capable of ferrying 120,000 lbs of cargo or 750 ready troops !

Hughes would finally get a government contract. Hence the Hughes-Kaiser HK-1. They figured on building a total of 500 of this air cargo giant.

Well, Kaiser was a man of fast action and results, and the development of the HK-1 moved at a snail's pace. After several months nothing tangible appeared. The Nazi subs were being systematically rubbed out and the need for such a radical airplane had timed out. Kaiser told the government that he was pulling out of the deal.

The deal was for three experimental heavy lift aircraft made mostly of non essential material. Word has it that Hughes could have backed out of the contract, and the government would have paid all costs up to that point.

Hughes was determined to prove that Douglas , Boeing and the rest of the aircraft establishment were wrong. The government reduced the contract to one aircraft. The Hughes Aircraft Company signed on.

Henry Kaiser, inadvertently, was the man to open the door for Howard Hughes to get a government aviation contract.

Now the Hughes Aviation Company could contribute to the war effort. Hughes was obsessed with his re-named Hughes H-4 (Hughes Aircraft design #4). We will follow it every step of the way.

A FEW NOTES ON KAISER'S INTERESTS IN THE EAST BAY AND SOUTH BAY AREA

In 1939, Kaiser opened the Permanente Cement Plant in Santa Clara County(Cupertino). As early as 1940, Kaiser built Permanente Metals Company built shipyard #1. Then #2, #3 and #4, all in Richmond. After the war, he created the Kaiser Aluminum Company, headquartered in Oakland, also the Kaiser Permanente Health Care hospital in Oakland and expanded all around California. Today in Richmond, there exists the "Rosie the Riveter" Museum. However, in truth it was "Wendy the Welder" that built the Liberty Ships... Rosie the Riveter built airplanes in the L.A. area.

BUILDING BIG – LEADS NOW TO COOKING HOWARD'S GOOSE - Way over budget and years behind schedule ...

We now know that the idea for this super giant aircraft was conceived by Industrialist Henry J. Kaiser, headquartered in Oakland, California. Government contracts were his specialty.

This led to Howard Hughes finally getting a much sought after government contract. Boeing, Douglas, Lockheed, Grumman, Northrop, Martin, North American, Consolidated, even Bell and Brewster were kept alive by them. Now Hughes Aircraft could make inroads, compete with the big boys.

Earlier, before WW-2, Howard foresaw a need for a high speed medium bomber, made mainly of wood. The British had the DeHavilland Mosquito that was basically made of wood. Hughes had purchased the rights to use the Fairchild product Duramold, and used it on his infamous D-2 medium bomber that the USAAC did not buy into.

Now this was the material to be used on the H-4. Duramold was a process of bonding thin veneers of birch in layers with water proof, resinous glues to form a composition of amazing strength and smooth contours.

Spruce would only be used on the wing spars. The completed plane would weigh in at over 400,000 lbs.

Hughes H-4 Hercules dimensions: Wing span 319 feet 11 inches. Length 219 feet 8 inches. Cargo area 24 feet wide by 30 feet high by 100 feet long. The overall height of the vertical fin above the waterline was 79 feet. All powered by eight Pratt & Whitney R-4360 Wasp Majors, composed of four rows of seven radial cylinders for a total twenty eight per engine. Nicknamed “corncocks” because they looked like corn cobs when viewed uncowed. Each developed over 3,000 H.P. These engines swung Hamilton Standard four bladed propellers having a diameter of seventeen feet two inches.

The Second World War ended in 1945, and two years later the plane had still not flown. The government had poured \$ millions into Hughes Aircraft Company, with no results. Senate hearings ensued, and Hughes was charged with every sort of impropriety in his dealings with the US Government.

Senator Owen Brewster (no relation to the Brewster Aircraft Company) of Maine, was involved in the investigation alluding that Hughes had not acted responsibly on the contract. Hughes claimed that Brewster was in cahoots with Juan Trippe, the president of Pan American.

Hughes said that Trippe wanted to absorb TWA. In the end, Brewster retired from the investigation, and went home to Maine. Hughes said he took a powder because he couldn't take the heat in Washington. The inquiry was closed.

BACK TO END OF THE BEGINNING – BUILDING BIG – HOWARD SHOWS WHEN YOU'RE RIGHT, YOU'RE RIGHT

Now we are up to speed on the political ramifications of the “ Spruce Goose ” (a nickname conceived by the press in reference to its wooden construction) Hughes detested that name, referred instead by name given to it by an employee who won the contest for the best name for the H-4. The official name was: The Hughes H-4 “Hercules”. So, shortly after those Senate Hearings, Mr. Howard Hughes on November 2, 1947 in harbor at Long Beach, took the controls of his H-4 and as storied in the opening of this article, lifted the giant flying boat into air, landed safe, *VINDICATED*.

After this 26 second flight 70 feet off the surface of the water for approximately one mile, Hughes outlined a series of next modifications he wanted:

1. Change the flight controls from hydraulic to electrical (the former was way too slow in response, and scared the hell out of him)
2. Beef up the hull at the frame supporting the tail assembly, as it nearly failed on takeoff.
3. Had installed on all the doors, entry/exit hatches; round bulged plexiglas acrylic windows.
4. Cosmetic changes: Remove all paint from the exterior, and repaint all Duramold areas with white lacquer.
5. Remove the “X” designator from the registration, so it now read N37602 instead of NX. That meant it was no longer experimental, but operational

So far no one has ever been able to verify the FAA approved of that last part, as the aircraft was never flown again. The 300 man maintenance crew continued to keep it in airworthy condition, in a climate controlled hangar, expecting more flights. (this staff level was maintained until 1962, then it was reduced to 50 until Hughes' death in 1976, when the company disbanded them)

But down deep, Hughes knew it would be foolish to do, since all his critics had now been silenced. Also, there was no longer any market for flying boats, the last two of which nearly cost him his life. He had lost so much confidence as a pilot, was now wracked with pain and an addiction to drugs.

He was very lucky to have escaped disaster with a slow acting flight control system on a very impromptu flight.

Hughes did the smart thing, he kept it locked up under guard in Long Beach.

(We'll wrap up what happened since this point, at the end of Jim's upcoming excellent tale of his 1/72nd tribute to this man Hughes and his big plane. Ed.)

BUILDING BIG – MODELLING THE HUGHES H-4 HERCULES — I have a basic philosophy on display models: They must be presented in all the same scale. Otherwise, the viewer is just looking at a bunch of model airplanes. With not a clue to their size, which is the first thing noted upon viewing the genuine article.

I chose 1/72nd scale for the same reason the War Department in 1942 chose it. The British found that that scale kept a wide variety of sizes manageable – small aircraft were still large enough to display identifying details, the really large ones were not so big so as to not fit a standard display table.

The HK-1/H-4 blew that scheme off the chart ! The wingspan is over 53 inches across, you'd need a double door van to haul it around. It would take two guys to hold it up and sideways to get through the door. There is no 1/72nd scale model of it on the market (at the time of Jim's original writeup).

Oh, I had heard of some. But after trying to verify rumors, Heavy Kits makes one, it just ain't true. Some outfit in South America makes one. Uh uh. No, no. If I want one, I got to make it myself.

(Jim's update, writing here a decade later: Lately, the Ukrainian outfit known as Amodel, released a 1/72 H-4 Hercules "kit" that is a pricey \$600 list (and now advertised on eBay for \$456.98). Even though the assembled model is much too heavy, and you must transport it in a van, in all it would be like hauling a sofa around. Yes, would have been cheaper, easier than my scratch built version. However, mine was engineered to breakdown into a manageable size.) (Editor's addenda to further update Jim's note. Amodel kit now hovers in \$320+ range, and has some interesting fit/design errors)

Okay, it's too big for ordinary transport and handling. I had to engineer a model to breakdown to manageable proportions. The outer portions of the wings beyond the engines, with their floats, would slip off and re-attach easily. Also, the vertical fin and rudder would have this same feature. This would prove to be the key to success.

BUILDING BIG – MODELLING THE H4 HERCULES - IT'S GOOD TO HAVE FRIENDS

Now, I was more than fortunate to have a friend as eager and as talented as Mike Herrill.

Mike is a retired aeronautical engineer, whose hobby is Execuform Models (vacforms).

Mike is skilled and enthusiastic. When I told him of my plan, he jumped on board. I told him I had the 1/200th scale HK-1, traced it and blew up the plans to 1/72nd scale, and they looked very, very wrong ! This didn't surprise Mike.

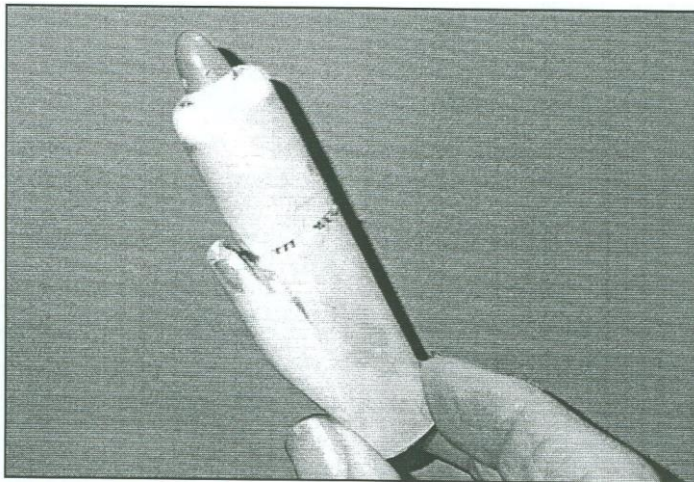
Back in 1995, he had made 1/72nd plans using Hughes engineering data. These would be the plans used for this model. Not only that, he didn't want to wait for me to build entire master.

If I did the hull, canopy, engine nacelle, spinner prop, engine and flap fairings, he would do the wings, tail and floats. I offered to pay for the materials, Mike provided free labor.

He got right on it, and when I sent him my masters, the vacuform copies came right back.



Mike Herrill with hull section vacform in his "lab" at Lake Arrowhead, CA

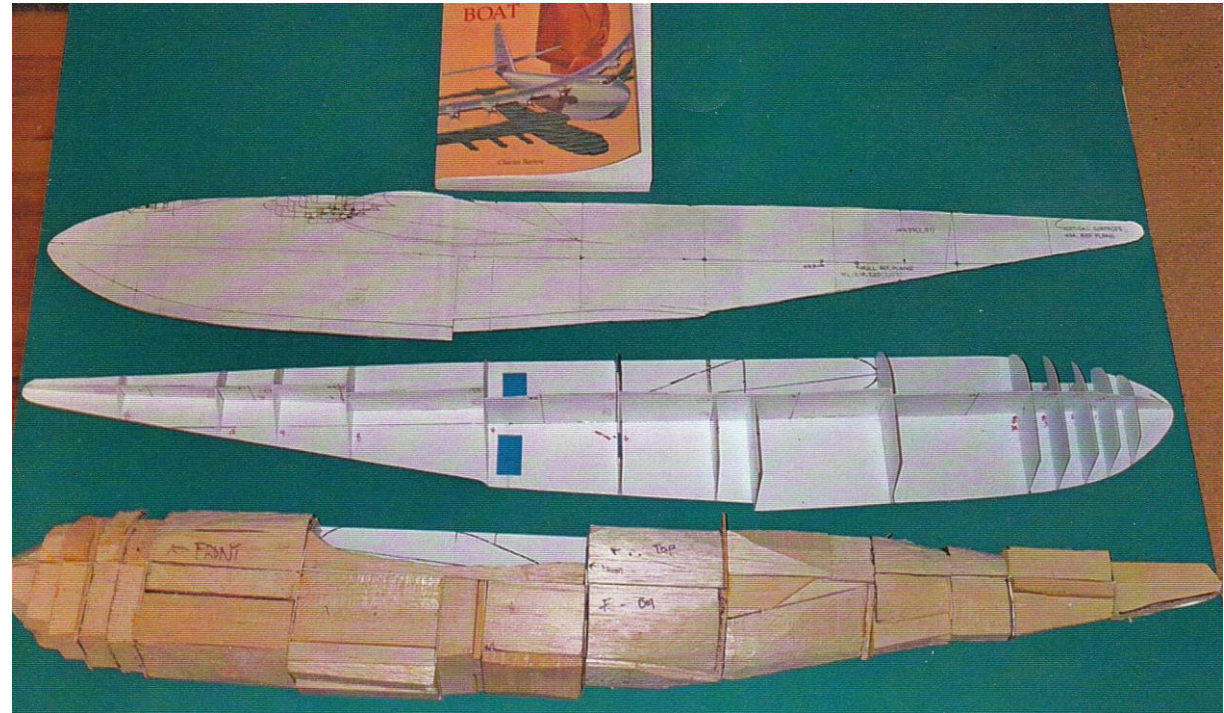


For a small fee, Roy Sutherland (Cooper Details, Barracudacals) took my nacelle, spinner, propeller blades and engine fronts, to make me eight beautiful copies in resin.

It's nice to have talent like that available.

Above, a larger look at Jim's complete engine nacelle assembly, including spinner. This would be the master for 8 copies to be cast in resin for this model.

Right hand photo: At top, the cutout of Mike Herrill's hull drawing – In middle: The .030 styrene assembly showing the template guides glued into place. Bottom: balsa fillers are glued into place on the styrene assembly

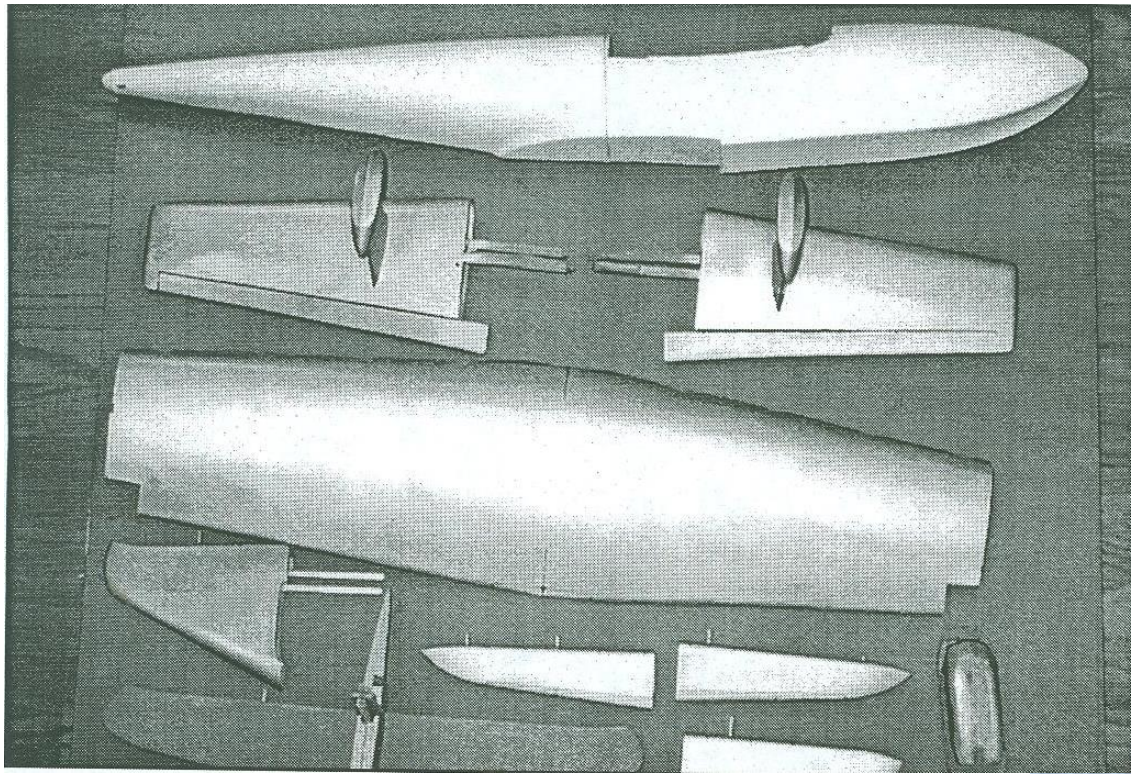


Left hand photo: At Top starting from left/center - the pattern for the clear cockpit windows. then the complete engine assembly pattern. Lastly, the flap hinge fairing.

Middle : The right hand hull pattern (styrene & balsa)

Bottom: The left hand hull pattern (styrene & balsa)

As you can see, both hull patterns sanded and sealed for vacuum forming. A yardstick for a sense of scale.



The vacform parts, coming together and readying for assembly.

This photo shows the interior fixed in place, ready for the clear cover to be installed. A curved, black, interior shroud blocks the rest of the seating from the camera's eye.

Note the chine line fencing, cut from .010 styrene sheet that follows the entire chine.

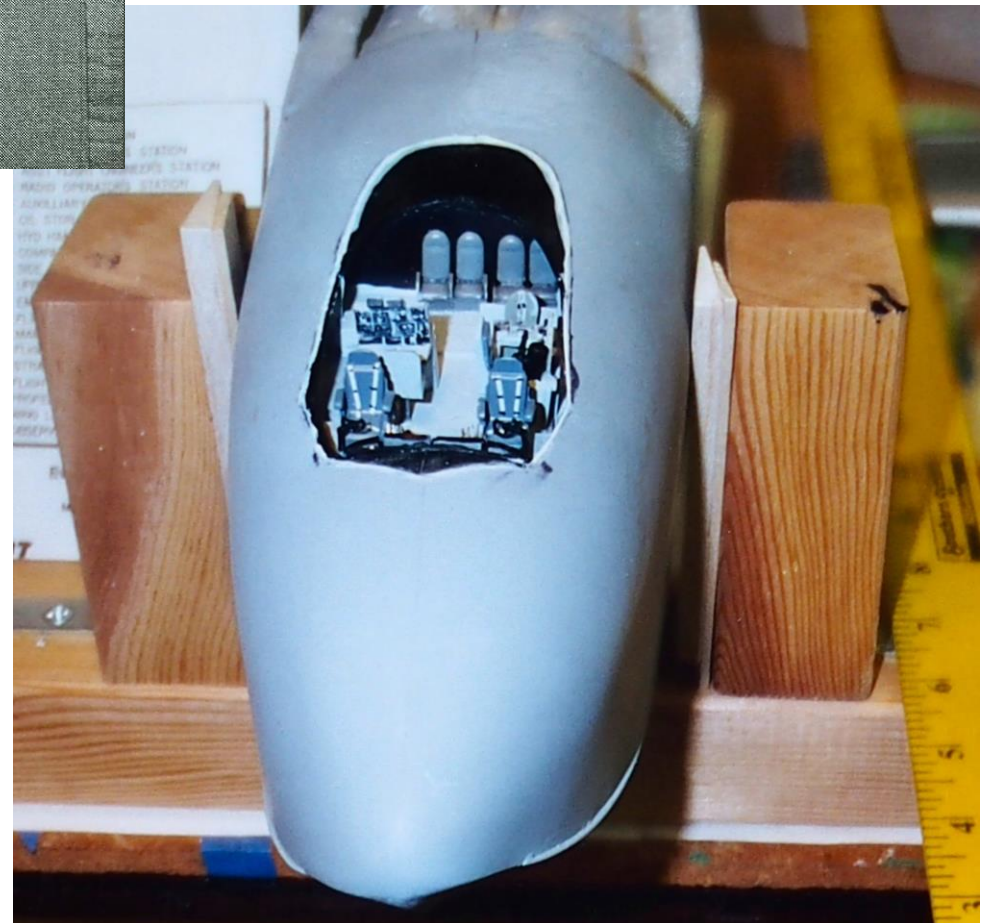
It was decided the flight deck would be the only interior visible. So I scratch built that, installed it after filling the remainder of the hull with Styrofoam blocks to support the flimsy vacform shell.

I cut the main spar for the wing and tail out of Sitka spruce. Then used balsa for the ribs and bonded the plastic slip joints to the main spar with resin.

The horizontal, vertical tail pieces were constructed in a similar manner.

Filling, sanding and priming took 6 passes and two 12 ounce spray cans of OSH brand all purpose gray 1446 primer, 4 ounces of Magic Sculpt brand resin, and a half tube of Squadron brand green filler putty.

An assembly jig made from Douglas fir 2x3s, was mounted on my construction table, with balsa shims and metal clamps. The fact that I worked with 4 different sections made the whole job manageable.



After completion, when all 4 sections interlocked and came apart smoothly, I installed the eight engines.

I had to make an auxiliary jig for this, so that all eight were aligned on all axes. **This was the most critical of all the construction procedures.**

The resin cast nacelles were bonded to the vacform wing using gap filling cyanoacrylate (super) glue.

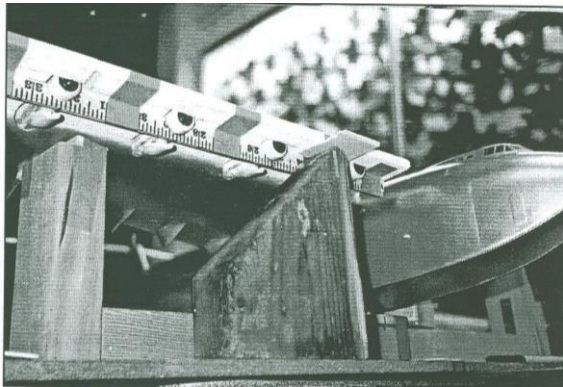
At this point, some detailing could commence. I made engine cowling flaps from .005 styrene sheet attached with super glue. The exhausts were made from .030 stock, as they were rectangular and not the usual round style.

All doors and hatches were added using thin plastic tape to simulate the doors and their hinges.

The elevators and rudder, separately vacuformed, were scribed for trim tabs and had hinges made of thin wire.



The model has been painted, with the clear cockpit vacform installed and moulded into the hull. You can look through the windows and view well the detailed interior.



A complex set of jigs were the only way to achieve proper alignment.

Attaching the eight cylindrical units containing the P&W 4360 Wasp Major engines and their accessories in streamlined nacelles and cowls.



The flaps were scored, and flap hinge fairings made from Magic Sculpt putty bonded to .020 styrene card masters were mounted. The ailerons, which had been cut away from the wing vac-u-form, were reinstalled with trim tabs scored in. I installed the wing landing lights, a tubular tunnel with a lamp reflector made from Bare Metal foil, covered with a clear lens made from vacform clear stock. The two landing lights in the wing float struts were fashioned in the same way.

There is a DVD, “Dream To Fly”, with actual color film of the first flight (November 2, 1947). I was able to pause this footage, in order to catch the different shades of reflectivity the bright silver paint on the real bird showed. I now spray painted all three sections with fast drying bright aluminum enamel. Now is the time for some serious scribing.

Panel lines were not abundant, because the finish was smooth due to the Duramold process. However, there were discernible lines on the wings, the vertical fin, and stabilizer, which I scribed.

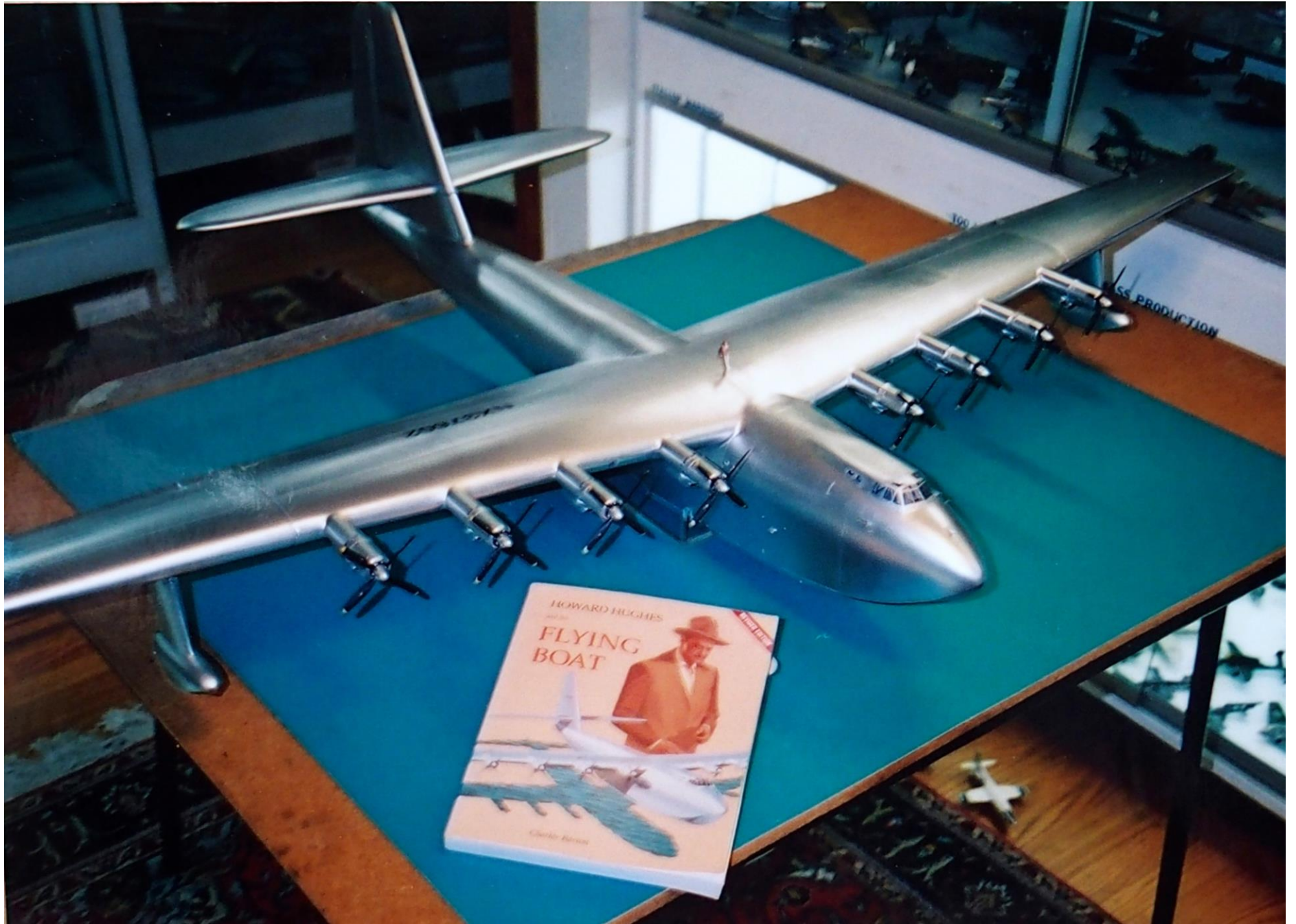
Close up of the finished right wing, showing to a good effect the scribing, blending of engines, exhausts, props and finish.

Close up of the tail showing scribing, the joint of choice for the vertical stabilizer “transportability”, outer wing joint for same.



I created a 1/72nd scale figure of Howard Hughes, based on a resin civilian figure made by Preiser of Germany. It scaled out to 6' 4" and I was able to dress him as he appeared for that day of the H-4 flight. This figure now stands by the hatch of his Hercules.

Now, I can fully understand and appreciate the challenge Hughes faced with such an enormous undertaking. Building one 72 times smaller than that, that couldn't fly was all I could handle.

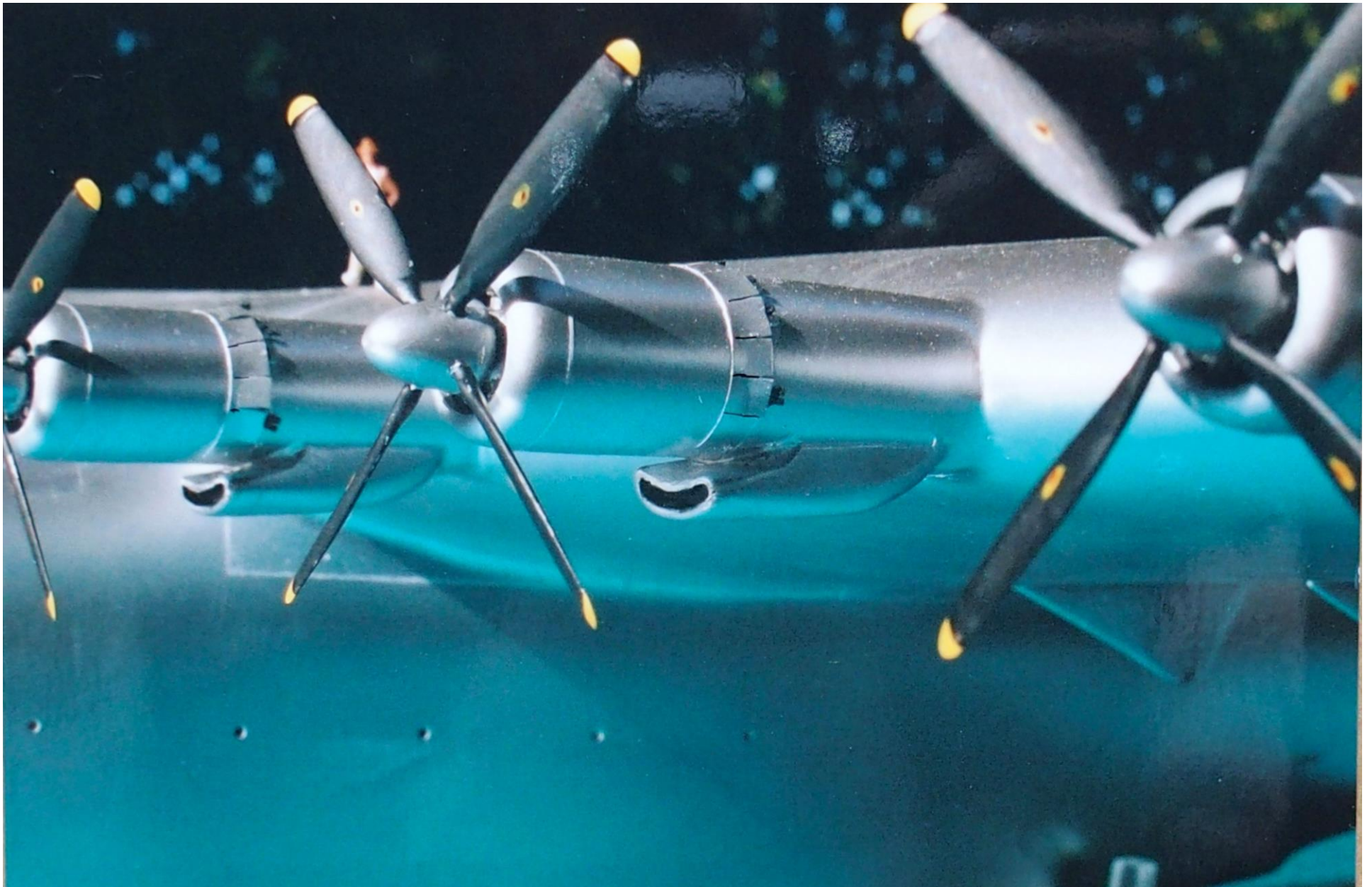


Overall view with book cover showing Hughes dressed for flying.

Peek into the cockpit



Nacelle, air intakes, cowl flaps and prop detail



1/72 scale Howard Hughes, decked out in his famous outfit with fedora and white sneakers, standing upon his creation.



In 1983, the actual Hughes H-4 became an exhibit at Long Beach, along with the ocean liner the Queen Mary. The Disney Company bought the Queen Mary, but didn't want the the Spruce Goose. In 1992, Evergreen Aviation of McMinnville, Oregon, bought it and shipped it to their new museum. The Museum folks, mostly unpaid volunteers, made an effort to show it in its maiden flight guise. It appears the silver color is off, and they didn't remove the glazing from the hatches. They did however, restore the "X" back into the registration. A few years later, the money ran out and the museum was closed. A new money man has been found and the museum has re-opened. If you are interested, you better get up there before the new outfit goes broke.

By the way, forget about the Hollywood film "The Aviator". Leonardo DiCaprio couldn't hold Hughes' jockstrap and the other 80% is crap. -JL

POST SCRIPT BUILDING BIG – MODELLING THE HUGHES H-4 HERCULES



Mr. Jim’s article rendering a second time was left in my care to fashion as I saw best to fit, as his instructions to me. My using the 2005/2006 article and his new material that wasn’t submitted, along with color versions of some that was, resulted in the article you just read.

On the left, a clipped photo from the end of the original article, which I think fits fine here as a lead in to a supplement article which is a blend of Jim’s fine new material taken as he said, into my care to edit as I felt best, and my own extra “addenda & updates” to fill in the part Jim refers to in his notes for the final submission.

I had done an article of my own, following Jim Lund’s “Aviation Evolutions” exhibition opening in October 2017 at SFO, which now neatly provides aforesaid afterword material

You can find the entirety of that particular tale here, if you wish. But check that after...

http://www.mickbmodeler.com/resources/THE_JIM_LUND_SST_FILES/JIMLUNDSPECIAL_TAMS_OCT_2017.pdf



POST SCRIPT BUILDING BIG – MODELLING THE HUGHES H-4 HERCULES – The DuraMold Connection



As noted by Mr. Lund in his article, the H-4 ended up in Long Beach on display, along with the Queen Mary, back in 1983. While I was able to in fact visit this display and tour both myself during a family excursion to the famous Rose Parade in Pasadena, I did not “do photography” at the time so have no shots of my own. This one is near the same time of my visit, and shows the “post flight” H-4 in all its refinished glory, per Hughes’ instructions. It’s also the shot used on Wikipedia for illustrating the largest one time use of the “DuraMold” process, which Jim gave me material to understand the importance of in the H-4 story.

So I open our “blended article” here with this picture and a note that DuraMold and AeroMold processes are both a set of methods well recognized and used for producing a wood based product that well substitutes for metal usages

They are patented and mostly differ in the temperatures used to achieve the resin/wood bonding. (Hot vs Colder)

[Creative Commons Attribution 2.0 Generic](#) Original by Alan Light, SpruceGoose 1987.jpg

From the 1920’s and on, wood was treated with layers of waterproof glue between plies, all variations of plywood. Mix with layers of metal and get “plymetal”.

Duramold and Aeromold process allowed for smooth compound curves. As early as 1912, in France, plywood was used to create monocoque (single shell) fuselages.

Hughes D-2. In 1943, a secret test for a high speed attack bomber, was conducted at his Harper dry lake facility at the Mojave Desert. Hughes himself made the design. The fact that he was not a qualified aircraft engineer led to a flaw in wing. Too much drag and improper control. He wanted to sell it to the USAAF, but lacked the proper connections. On the plus side, the Duramold wooden construction worked perfectly. and was used with success on the H-4 Hercules, and earlier production of the D-2.

1/72nd scale Hughes D-2 Attack Bomber, Execuform kit Model & photo by Jim Lund



Timm N2Y-1 US Navy Trainer, 1942.

Timm Aircraft of Van Nuys, California, used "Aeromold", very similar to Fairchild's "Duramold" for this successful trainer

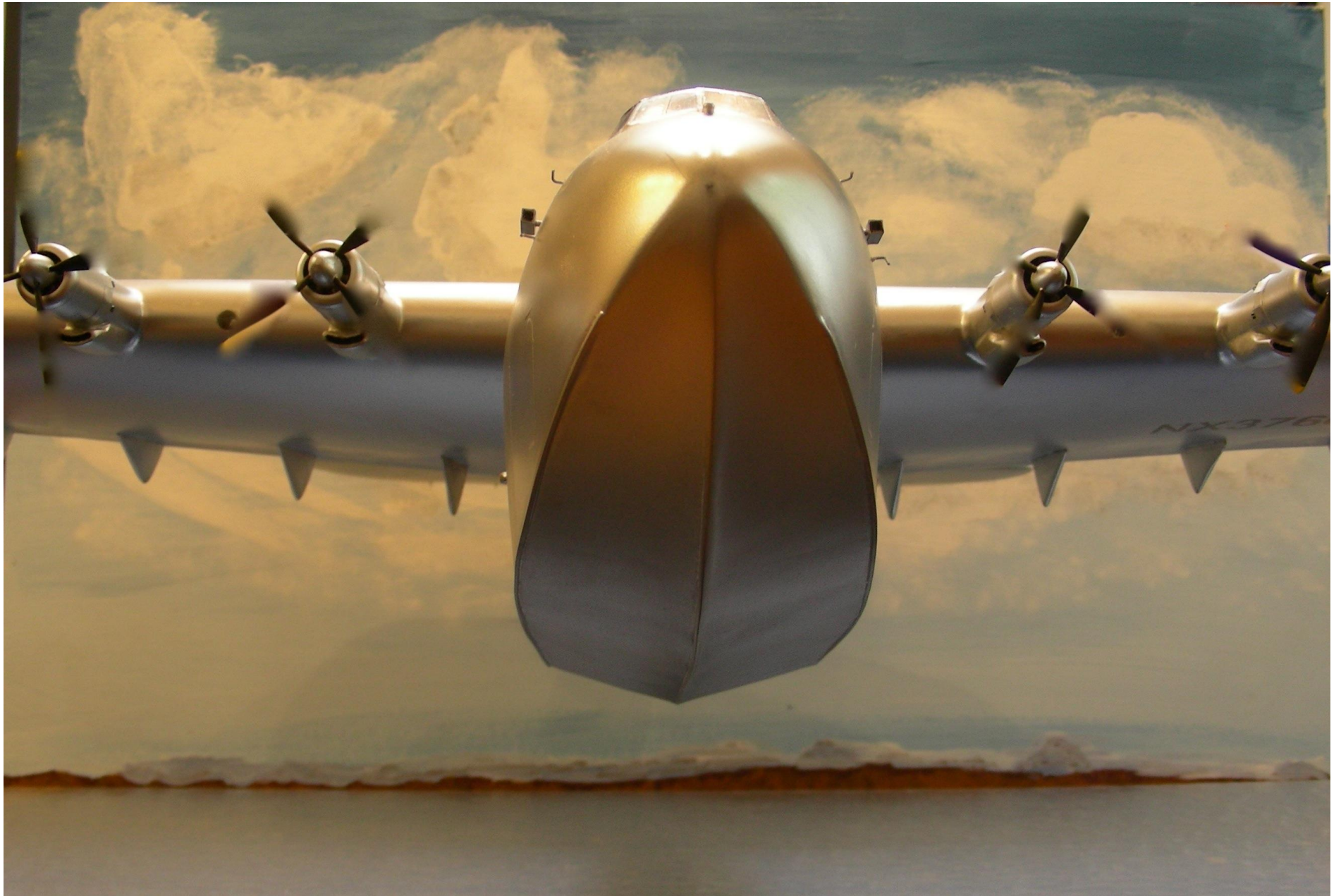


1/72nd scale Model and Photo by Jim Lund (Timm N2Y vacuform kit from Execuform)



Compare Jim's " wooden wonder " with the " aluminum overcast" Monogram B-36 (both models made of plastic, and are 72 times smaller) in this photo of Jim's display cabinet in 2006.

Today the H-4 model resides with the SFO Museum of Aviation. *(which Editor just happened to have a picture of on cover, plus opening page of this)*



Dramatic depiction of the Hercules maxing out at 40 feet above the Long Beach Harbor.
The great advantage of model photography, is that you can get an angle that the cameras never got in reality.
Just think...if you were out there in a rowboat, I bet you would duck.

HAPPILY GIVING JIM THERE THE LAST WORD AND LAST SHOW TO SAY-

This chapter of BUILDING BIG (# 5) is finished. – *WJL and MB fini*



IN AN UPCOMING EDITION Of The SST !

FROM THE ANNALS of Mr W J LUND

EDITOR WILL RELAY

SUCH A TALE OF TACKLING

this mythical beast...

Whom history in passing has not been so kind

Nor has the article publishing industry...

- *mb fini*