P-51C THUNDERBIRD PART 5

Dakota Territory Air Museum's P-51C Thunderbird

by Chuck Cravens

AIRCORPS AVIATION

Warren Pietsch and Mark Tisler hold a painting of Thunderbird by Daryll Legg, used by permission.

DAKOTA TERRITORY AIR MUSEUM

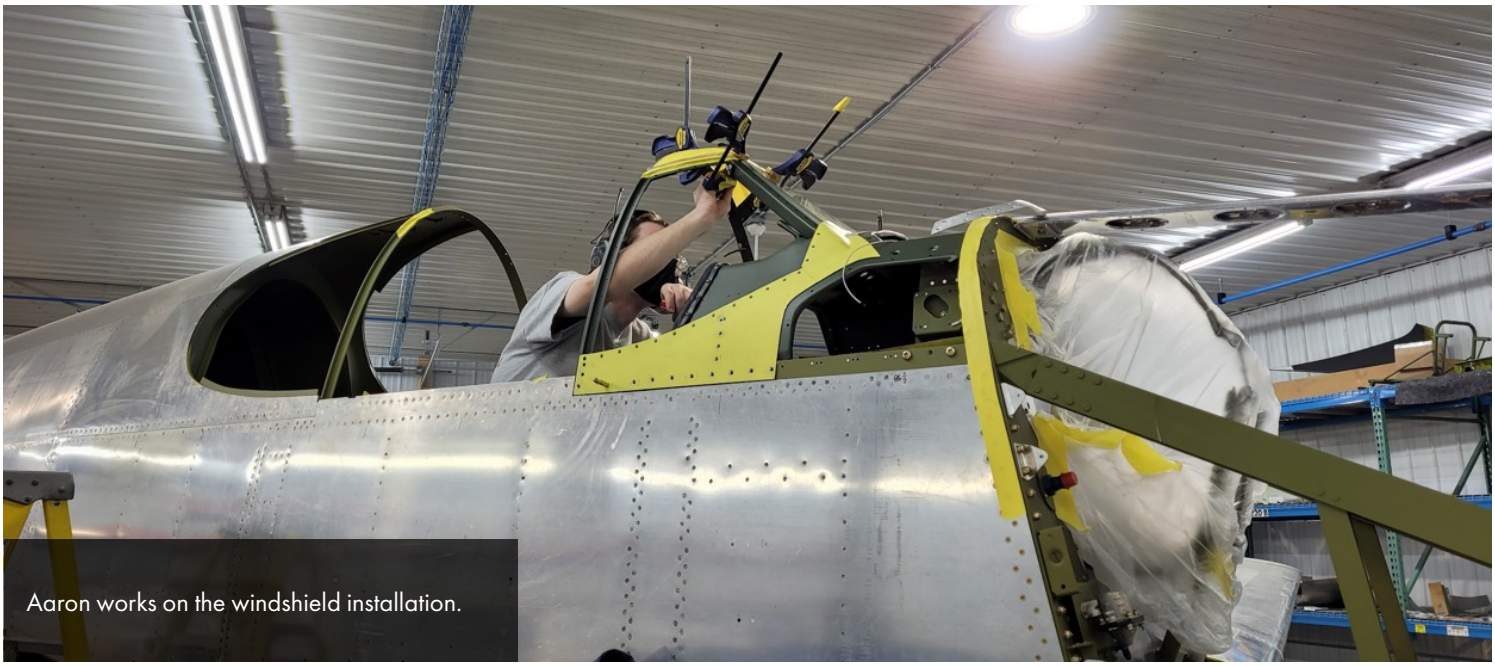
www.dakotaterritoryairmuseum.com

Here is a closer view of Darryl's excellent painting.

Work on the cowling, fuselage, and wings all progressed over the last few weeks. The cockpit components and cockpit enclosure were areas that saw attention as well.

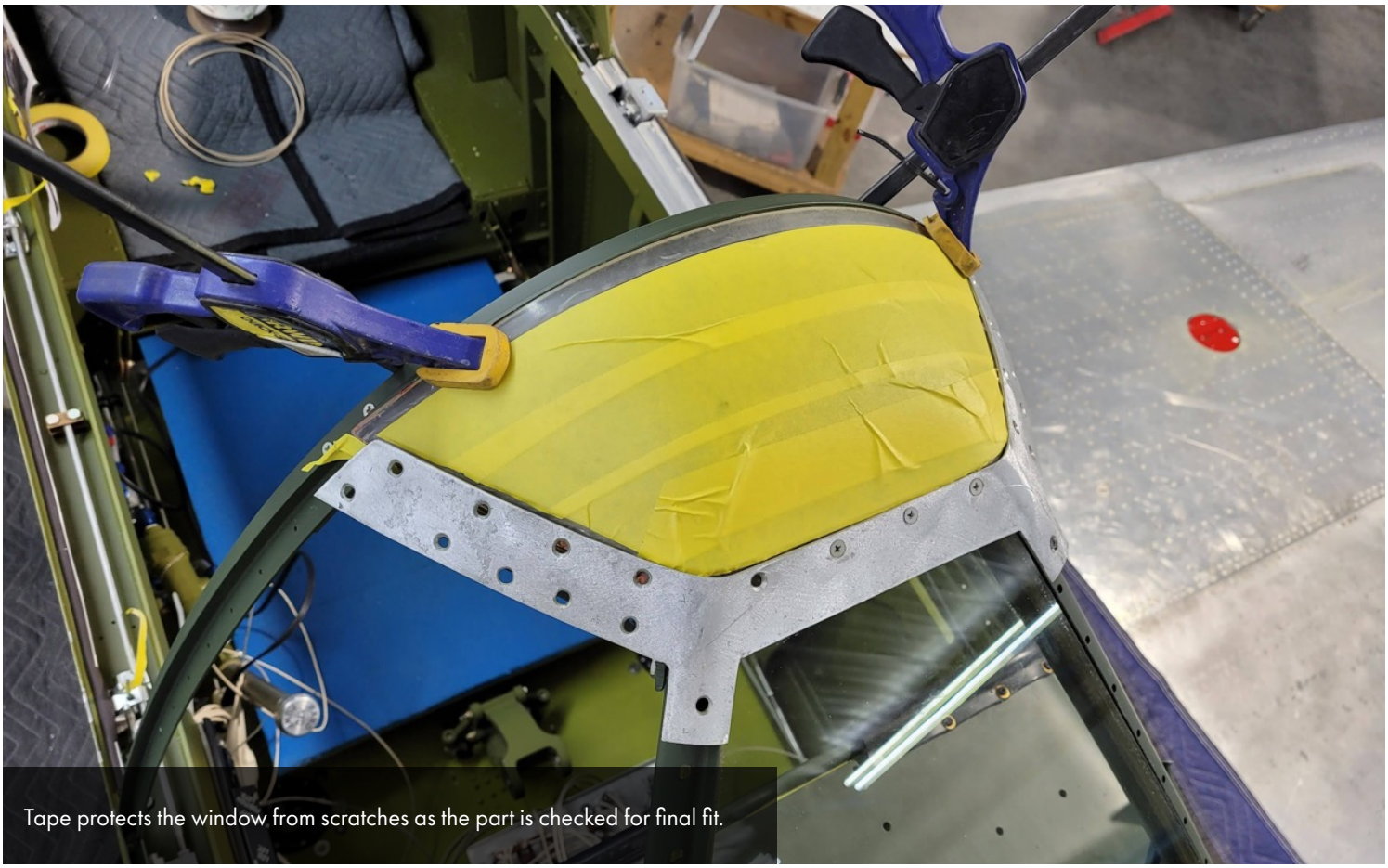
Cockpit Enclosure

Fitting the windshield assembly and the rest of the cockpit enclosure is an exacting process. The aluminum frame structure needs to be fitted, and each window has to be trimmed to fit precisely.



Aaron works on the windshield installation.

The top windshield section is set in place to determine where trimming is necessary.



Tape protects the window from scratches as the part is checked for final fit.

Aaron has also been working on the side windows for the cockpit enclosure.

The side window is hinged for access to the cockpit from the wing.

One side window on the windshield and the two rearmost panels of the cockpit enclosure are in place.

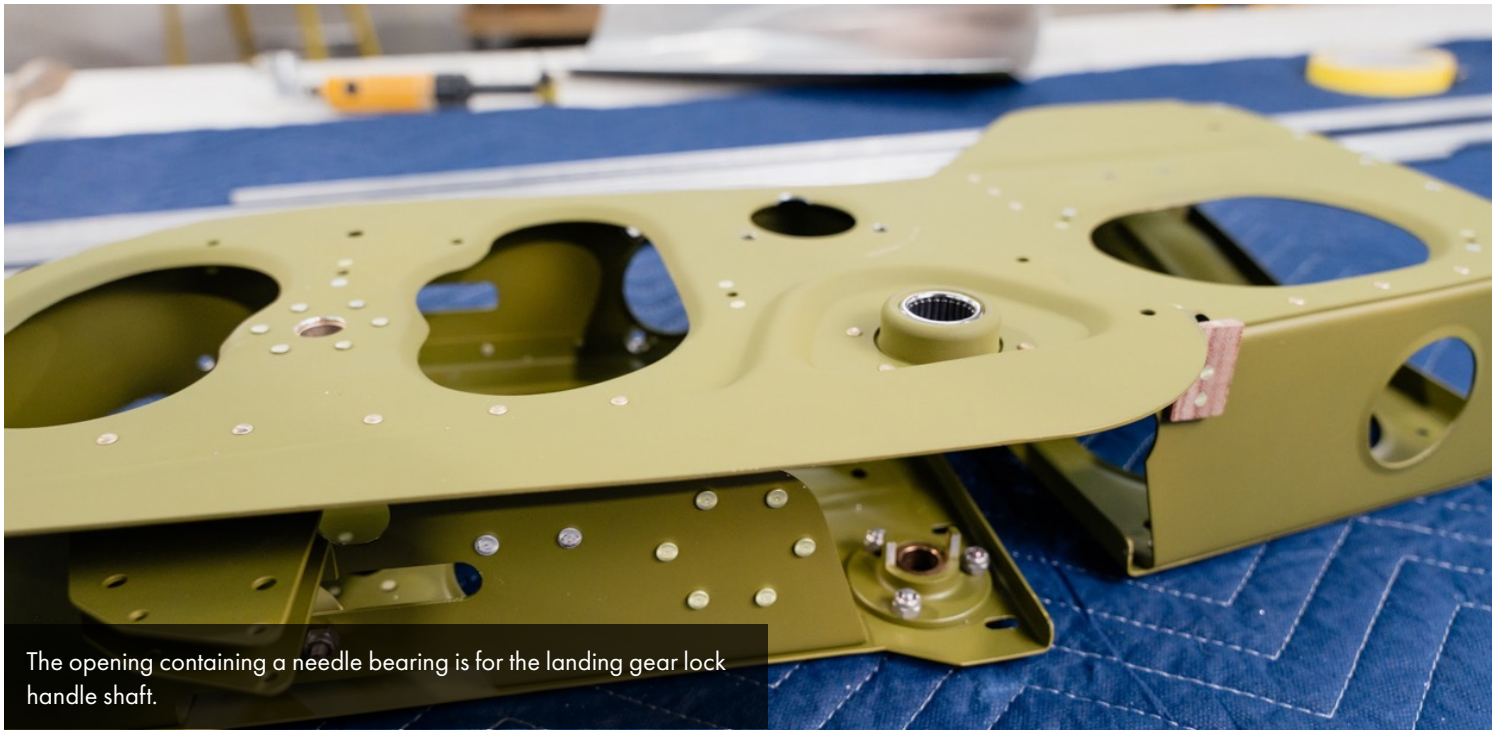
With the top panel in place, the enclosure nears the point where the permanent installation will be done.

The distinctive birdcage style cockpit enclosure is clearly visible here.

Fuselage

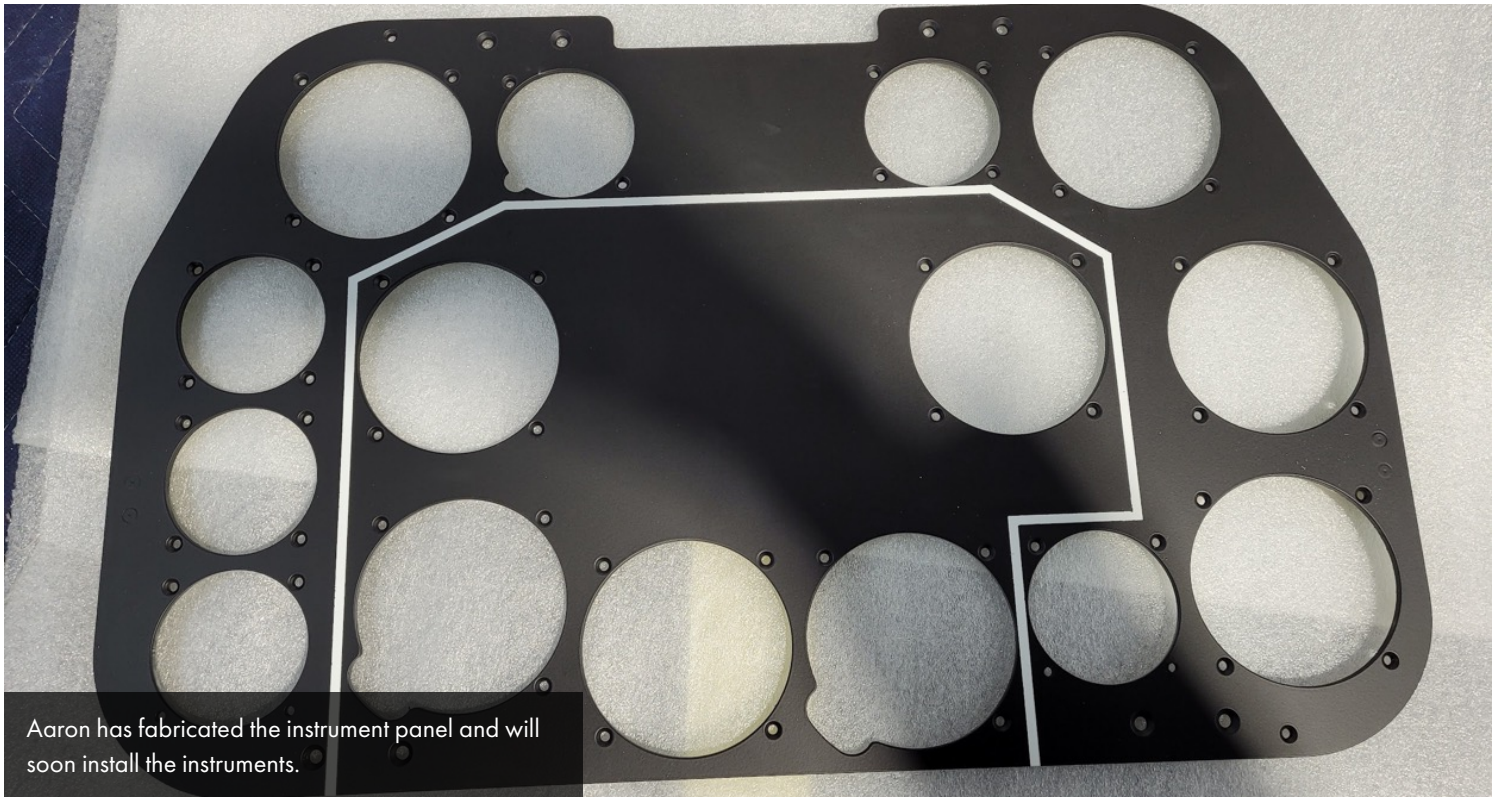
Work on the components of the cockpit progressed nicely since the last update. Some firewall forward engine accessories were installed. The scoop area is in the process of preparations and installation of the radiator. Several skin sections in that area were trimmed and fit into place.

This is the trim console. The smaller round opening without a needle bearing is for the elevator trim tab control.

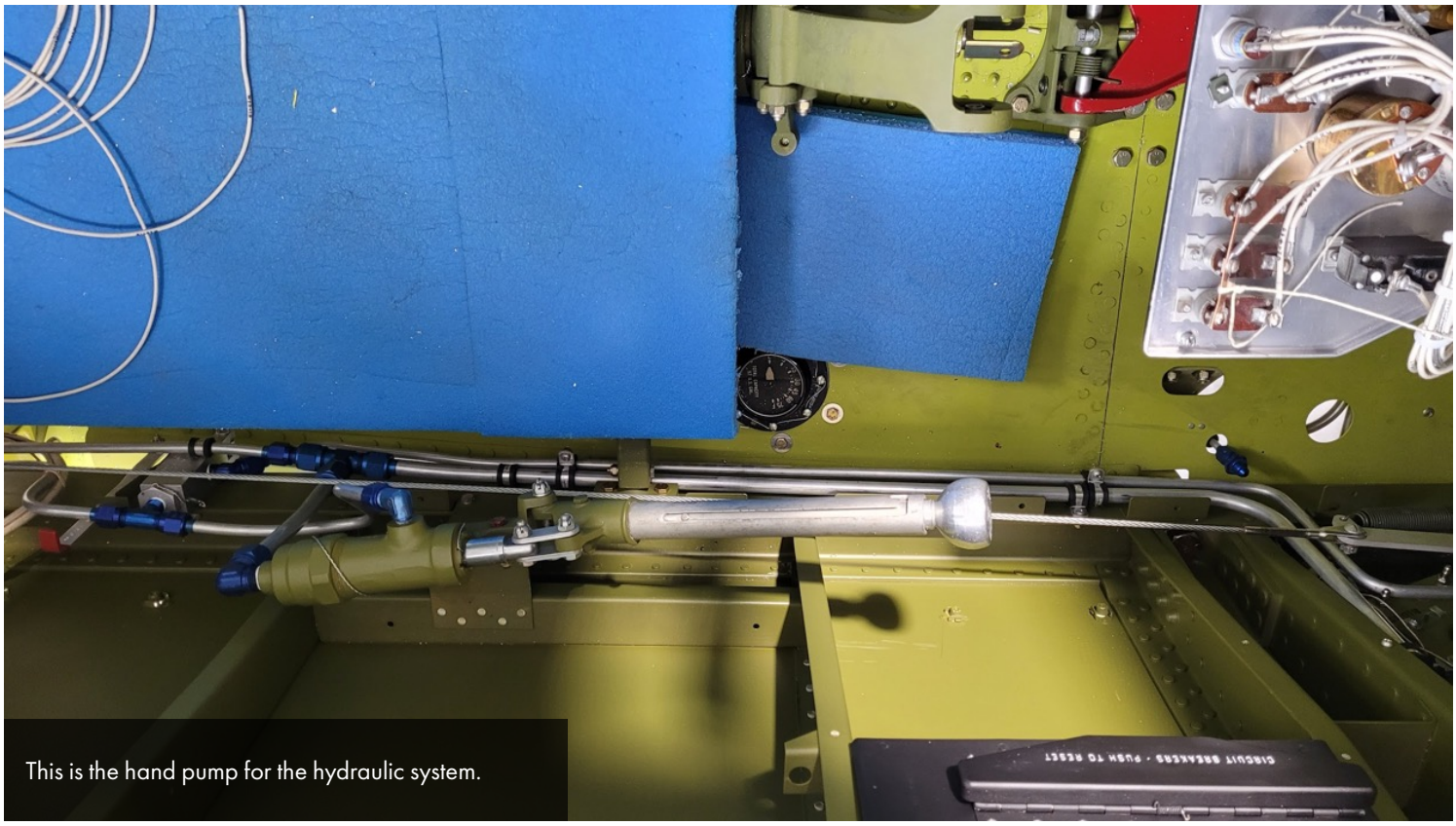


The opening containing a needle bearing is for the landing gear lock handle shaft.

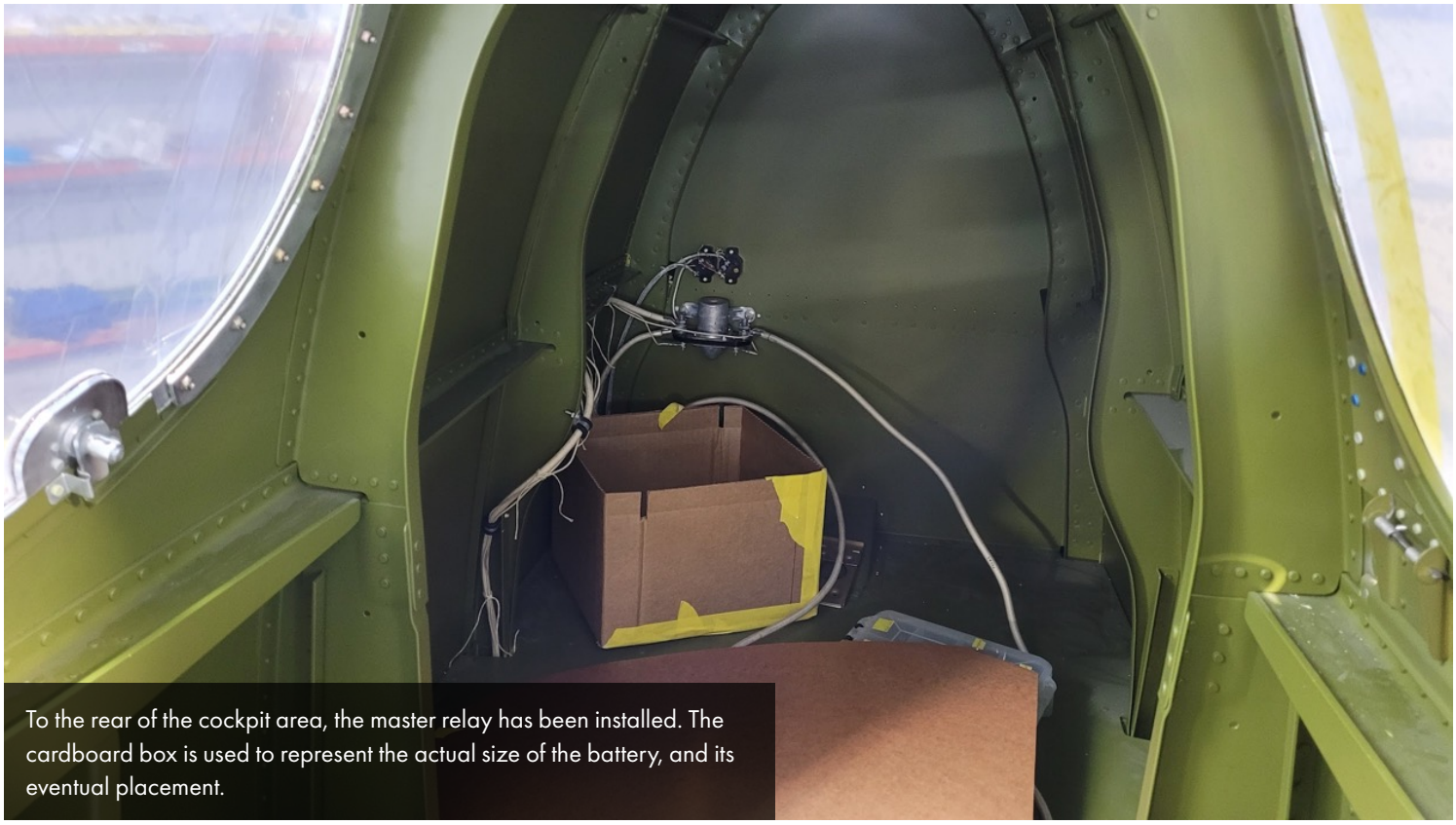
The trim console has been installed.



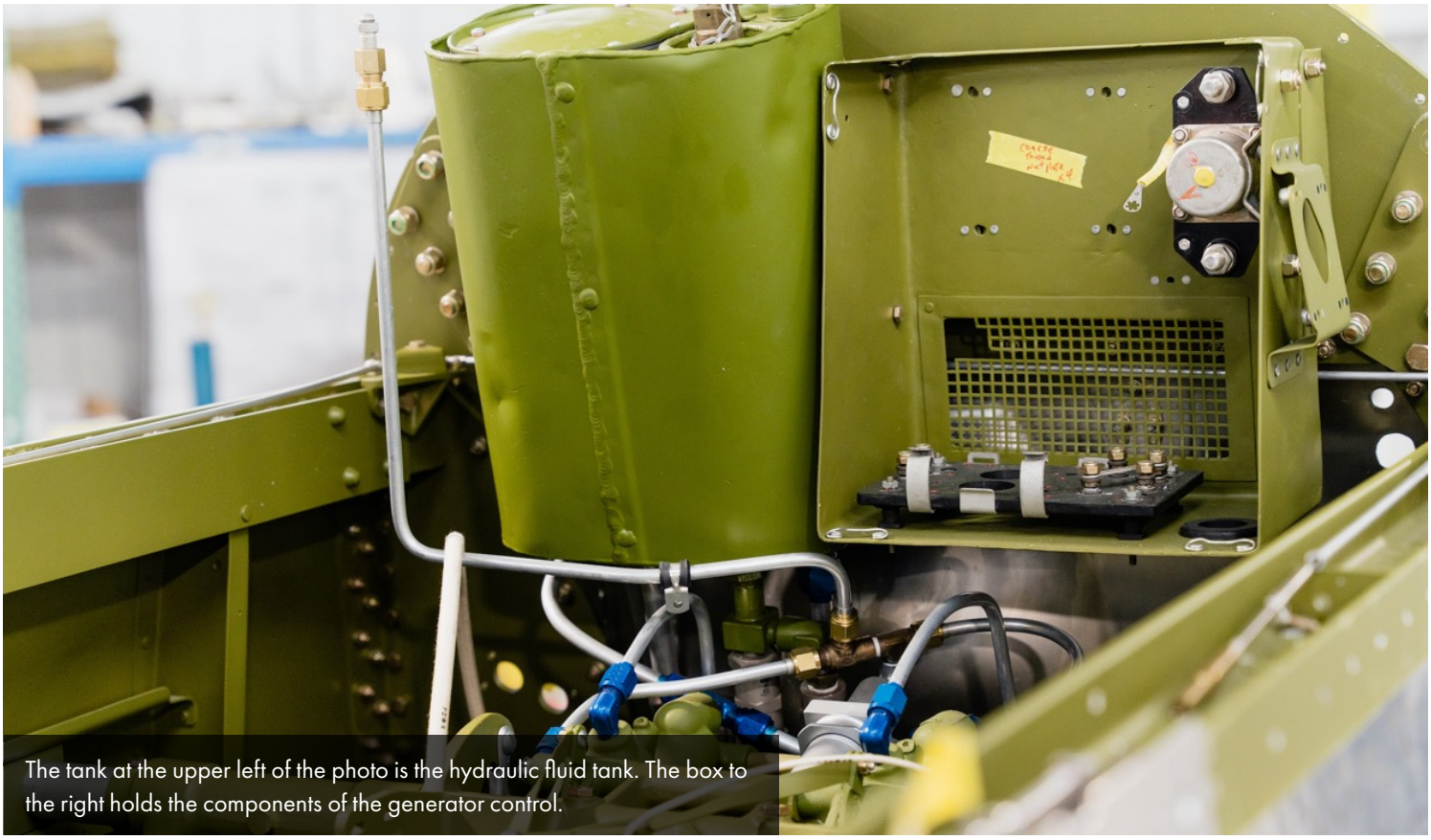
Aaron has fabricated the instrument panel and will soon install the instruments.



This is the hand pump for the hydraulic system.



To the rear of the cockpit area, the master relay has been installed. The cardboard box is used to represent the actual size of the battery, and its eventual placement.



The tank at the upper left of the photo is the hydraulic fluid tank. The box to the right holds the components of the generator control.

This is the starter relay, mounted to the firewall.

This is the shield assembly for the booster coil.

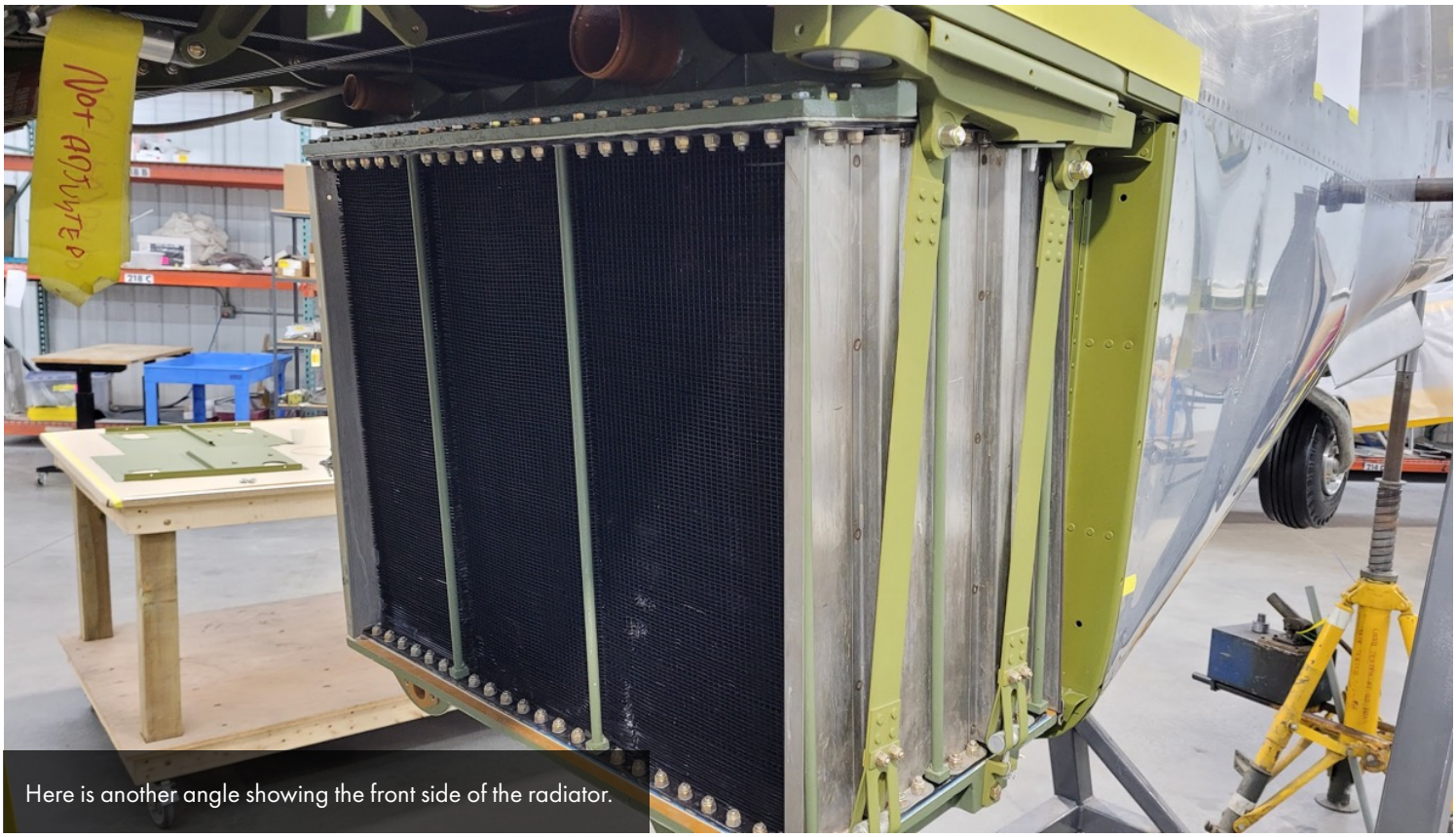
The large upper cable is an elevator control cable. Below that, the smaller cables are rudder trim cables. Finally, the large cable near the bottom of the opening is the rudder cable.

This skin section fits below the radiator.

The radiator mounting straps hang ready for when the radiator is mounted.

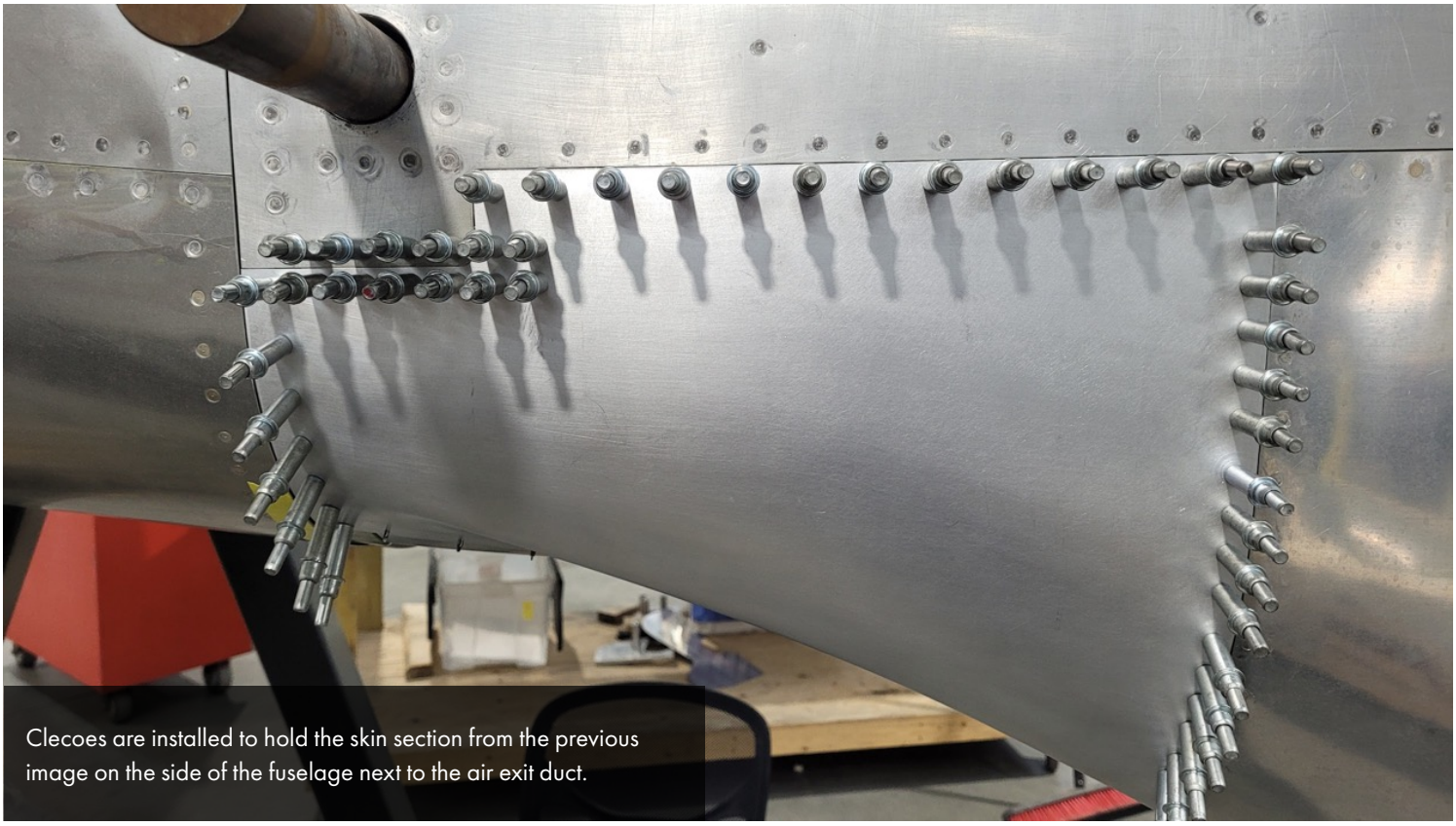
Here is a detailed picture of the radiator strap end.

The radiator has been installed.

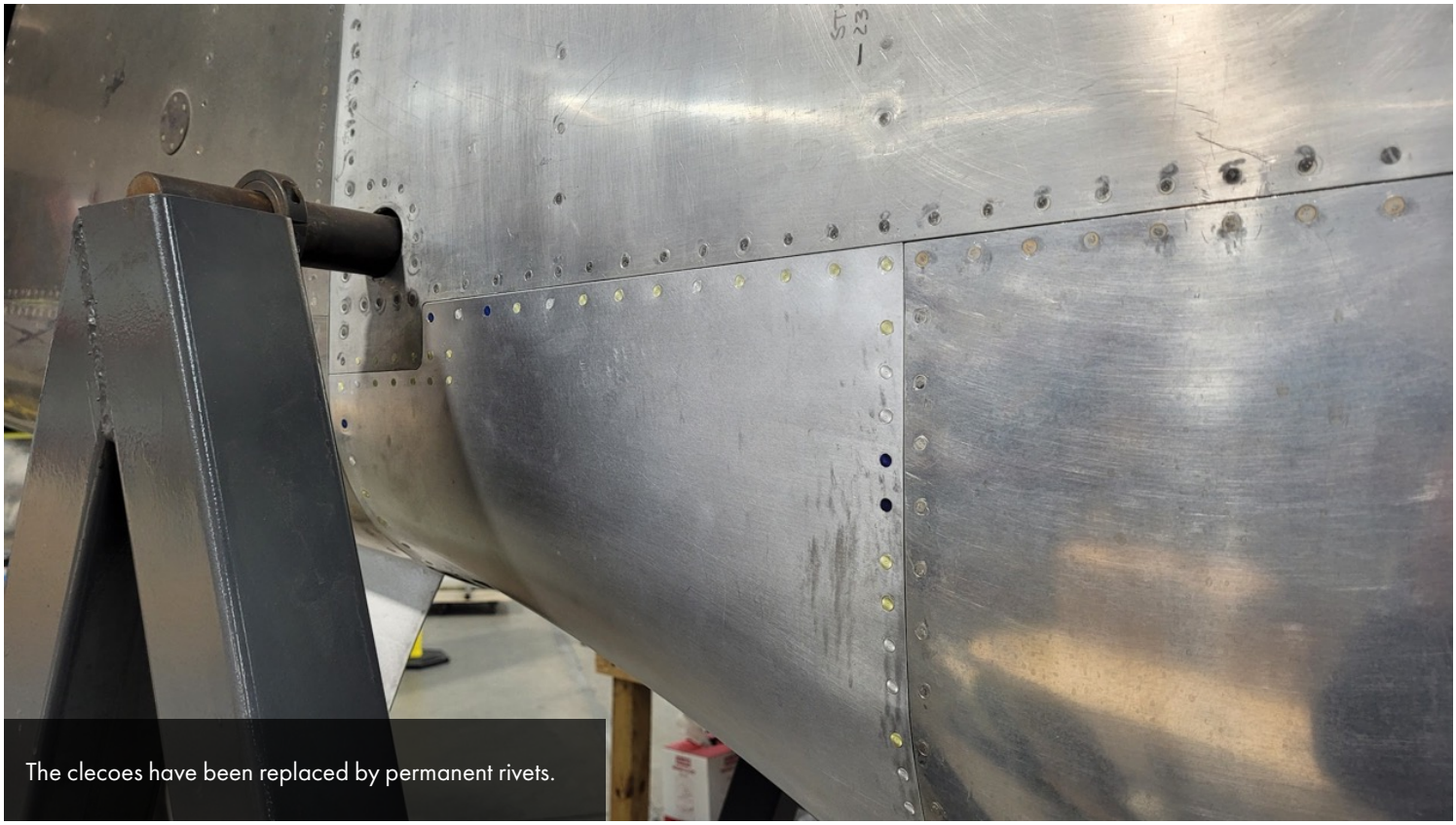


Here is another angle showing the front side of the radiator.

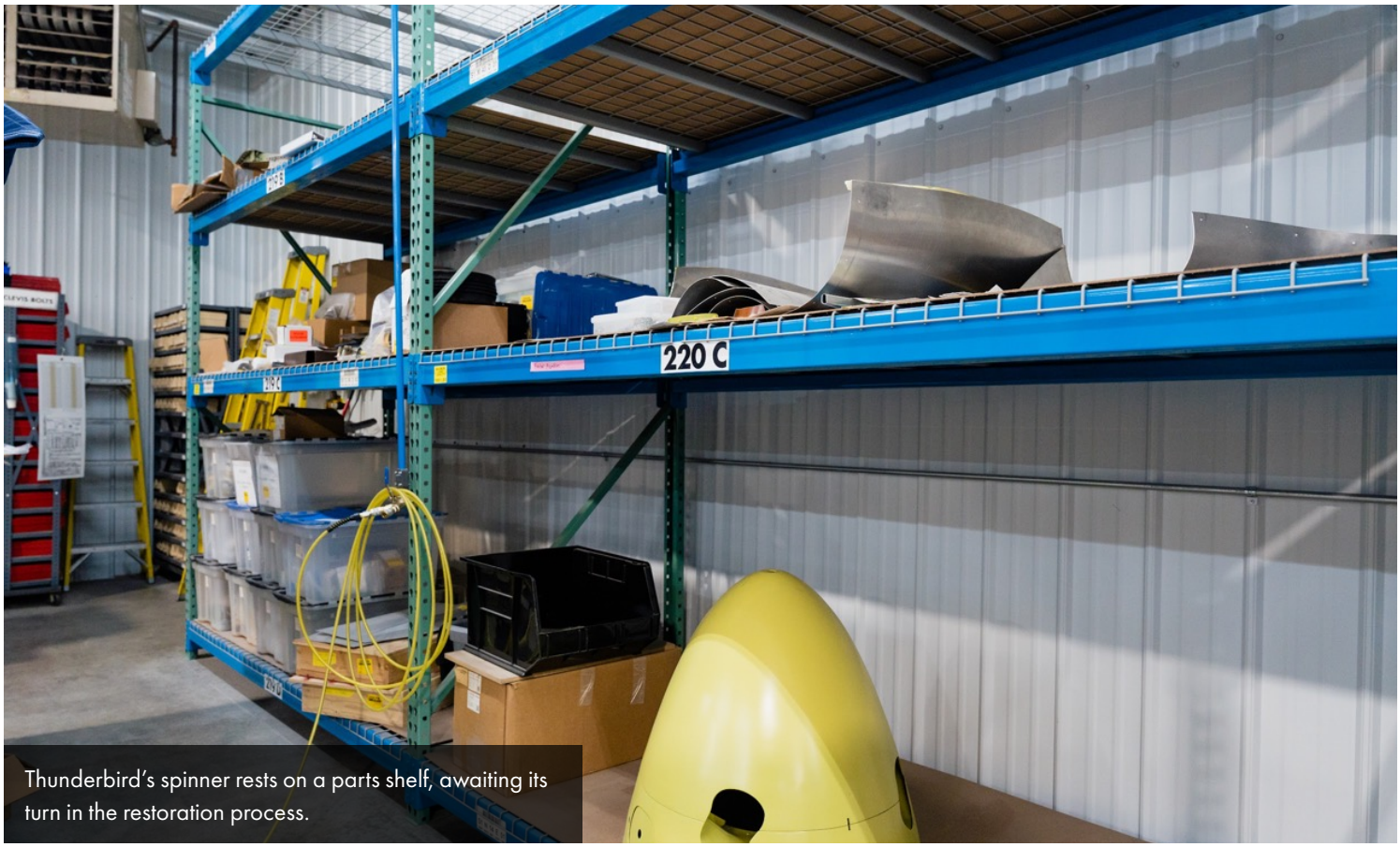
This complex skin section fits at the rear of the radiator scoop and blends the scoop contour into the rear fuselage.



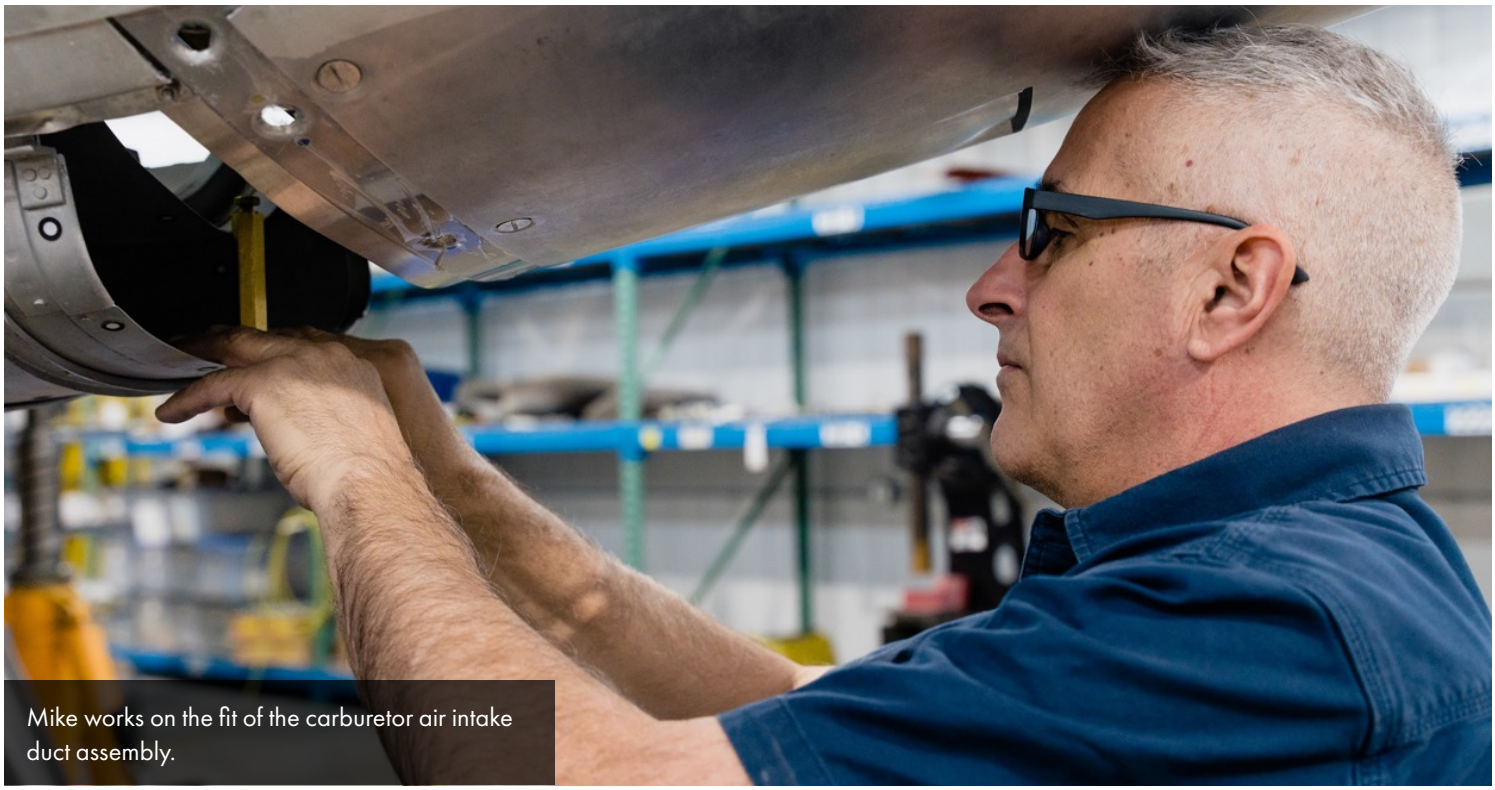
Clecoes are installed to hold the skin section from the previous image on the side of the fuselage next to the air exit duct.



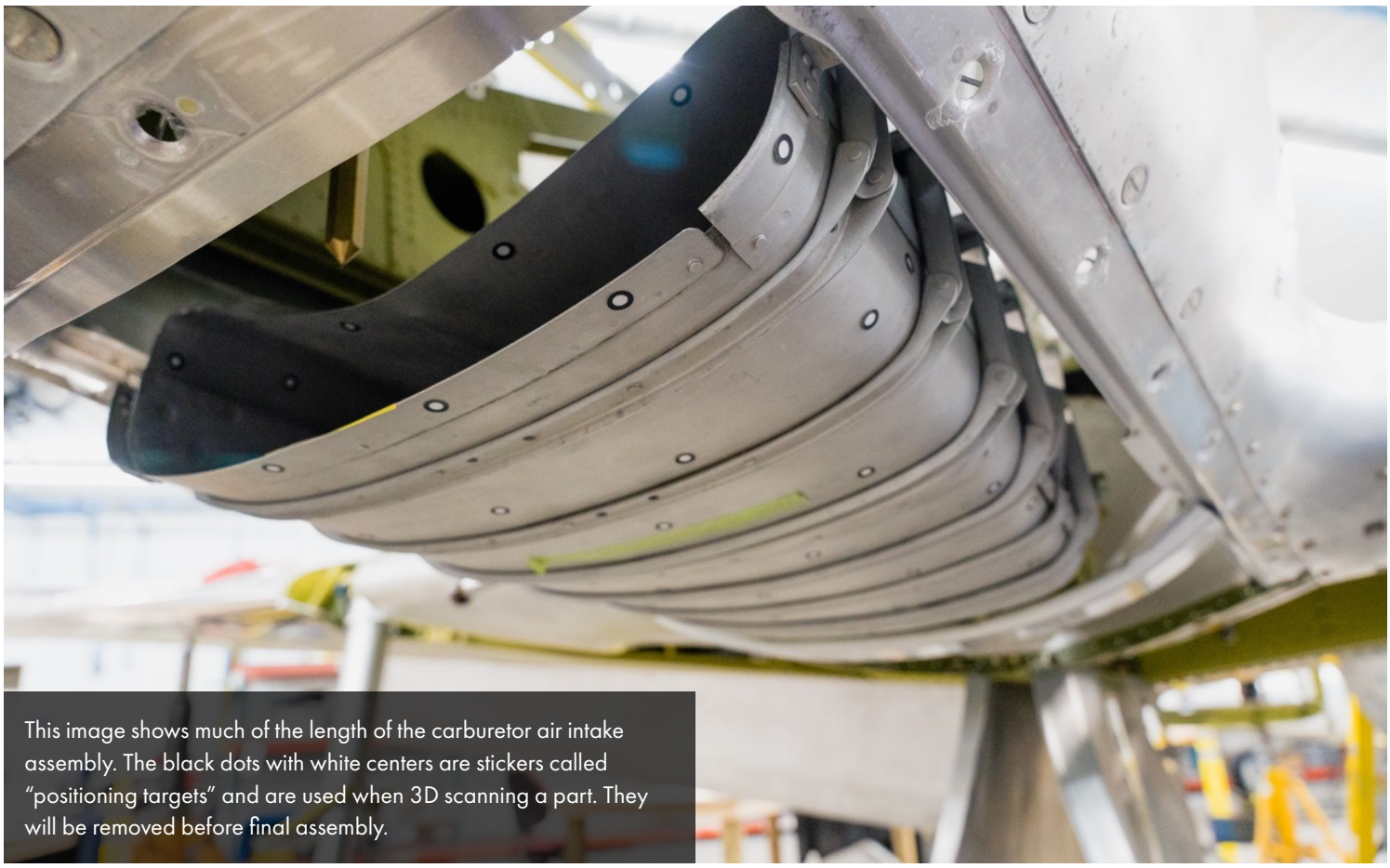
The clecoes have been replaced by permanent rivets.



Thunderbird's spinner rests on a parts shelf, awaiting its turn in the restoration process.



Mike works on the fit of the carburetor air intake duct assembly.



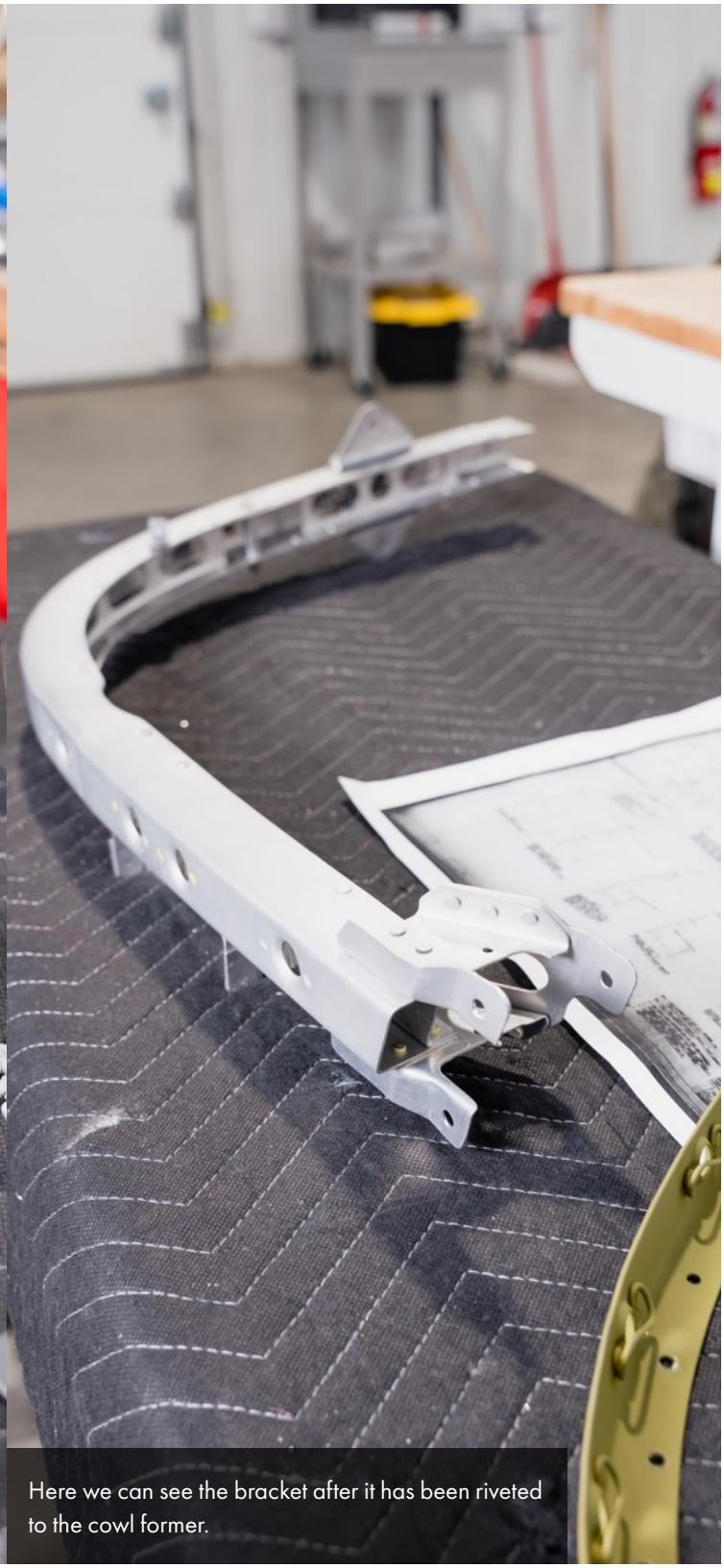
This image shows much of the length of the carburetor air intake assembly. The black dots with white centers are stickers called “positioning targets” and are used when 3D scanning a part. They will be removed before final assembly.

Cowling

Mike spent a great deal of time fitting skin sections to the cowling. The cowling is one of the areas where Thunderbird had a few modifications from the standard P-51C configuration.

The air intake "smile" is in place.

This bracket will be riveted to the cowl former and will attach the former to the engine mount.



Here we can see the bracket after it has been riveted to the cowl former.

The lower cowl section on Thunderbird is broken down into a three-piece assembly that enables fitting the D model wing to the C model fuselage. A standard P-51C has a single piece cowl section here.

Here is the rear lower skin section of the cowling that is placed just in front of the wing. It is one part of a three-section lower rear cowl as used on P-51Ds. It covers the air induction assembly. Normally a P-51C would have a one-piece skin. This change is part of the necessary modifications to mount a D-model wing on Thunderbird.

In contrast with the three-section lower cowl skin on Thunderbird, P-51C Lope's Hope 3rd has the standard C model one-piece lower cowl skin.

Mike works on fitting another cowl skin panel.

Here is a view from the left side as the cowl takes shape.

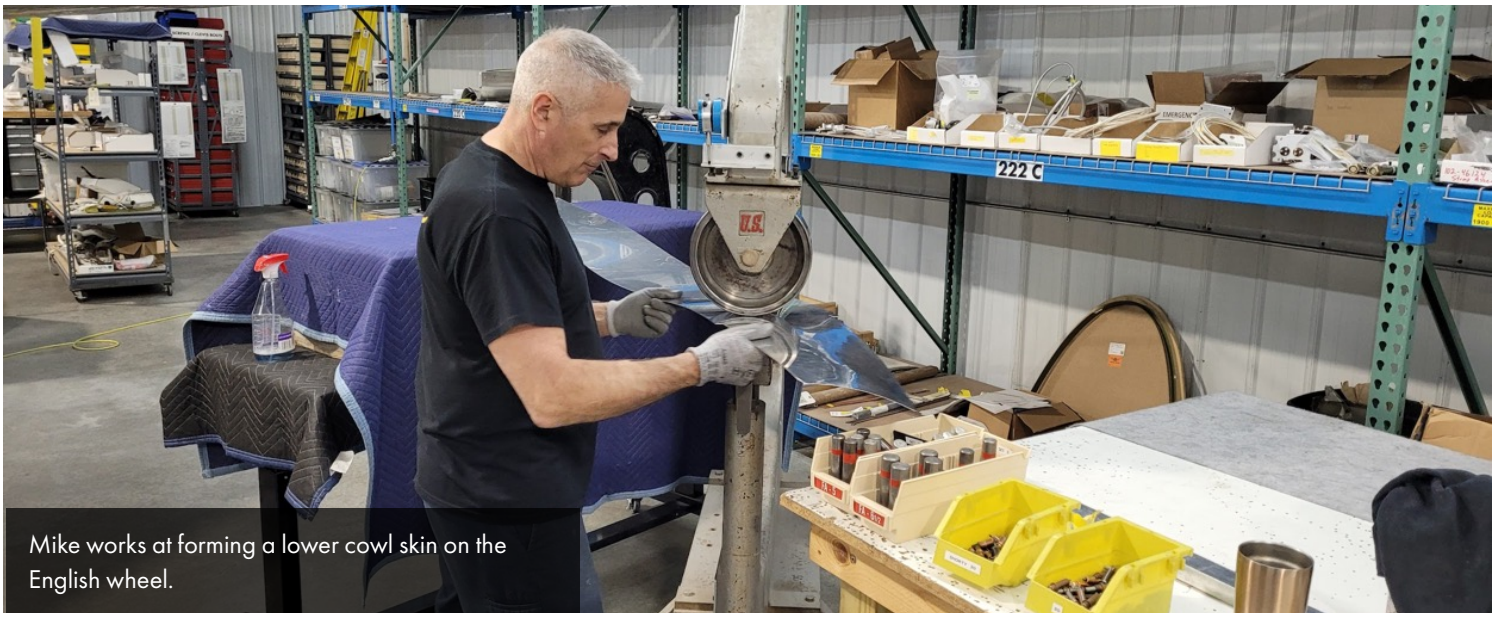
Fitting work is progressing in this view of the inside upper cowling.

Most Mustangs have a cover for the rectangular opening near the center of this image that has 32 holes in it. On a Mustang that is completely equipped as North American built them, the holes allow air to pass through an intake air filter during ground operations. Many restored P-51s flying today do not have air filters even when they have the standard perforated cover.

Thunderbird had all unnecessary components removed, including air filters, in a weight-saving effort. New holeless covers for the fresh air intake opening have been made and fitted.

The cover on the left side is identical.

The original Thunderbird did not have intake holes in the rectangular panel, as seen in this famous photo of Thunderbird and Jackie Cochran. There was probably a slight reduction in drag without the holes. Photo, FÉDÉRATION AÉRONAUTIQUE INTERNATIONALE (WORLD AIR SPORTS FEDERATION) https://www.fai.org/record/4477



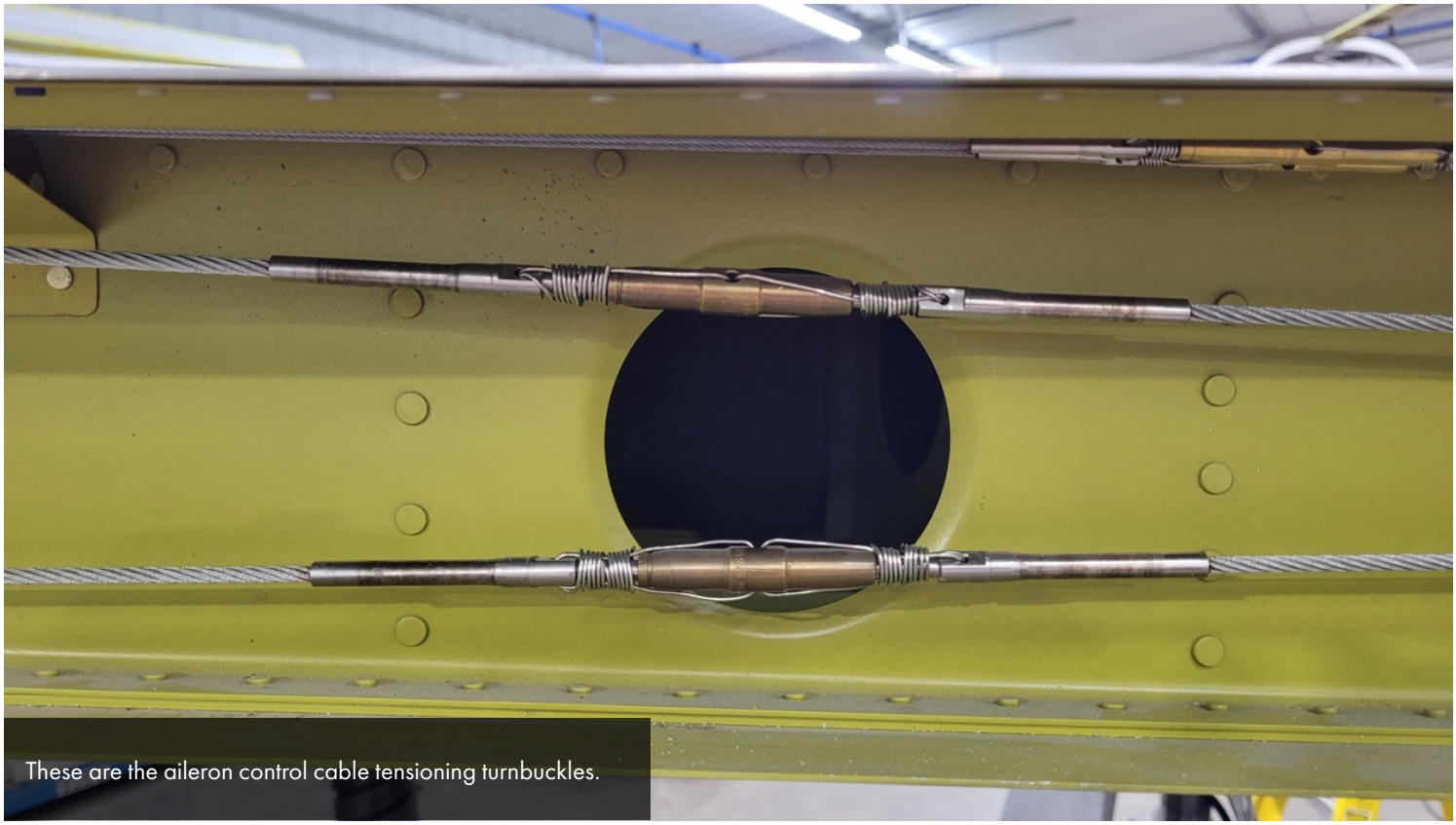
Mike works at forming a lower cowl skin on the English wheel.

Wings

Thunderbird's wings have a few differences from a military Mustang, most notably that there are no gun bays or ports.

The right aileron has been installed.

The olive drab pulley with aileron control cables encircling it is the outboard aileron pulley assembly.



These are the aileron control cable tensioning turnbuckles.

Aileron control cables run through a phenolic guide.

The right landing gear leg has been retracted into the up and locked position.

The upper end of the main landing gear strut is in place. The thin cables connect to the landing gear timing valve.

The skin covering the upper landing gear is riveted.

Unlike a military Mustang, Thunderbird has no gun ports on the leading edge of the wing.

This is the left-wing leading edge section that fairs over where the gun ports would be.

Here is a view into the gear bay.

Mark works on a gear door.

Mike attaches the air intake elbow assembly that directs air up to the carburetor.

Highlights of the Bendix Trophy Race's History

Thunderbird's fame comes in large part from its 1949 Bendix Trophy win and all-time propellor-driven race average speed record of 470.136 mph. It also was the last time the propellor-driven race was held, so Thunderbird was the final winner of the Bendix Trophy race propellor division.

The Vincent Bendix race originated with a 1931 meeting in the club car of the New York Central Railroad's premier passenger train - the Commodore Vanderbilt. Vincent Bendix was a famous and very successful industrialist and inventor. His company made everything from automobile brakes and starters, to avionics and pressure carburetors for airplanes. He was approached by the originator and promoter of the National Air Races, Clifford Henderson, who managed to sit down with Bendix and propose an annual free for all cross-country air race.

Henderson's sales pitch was that his proposed race would provide a goal for airplane designers, builders, and pilots to "really get down to business." By that, he meant they would be incentivized to build faster, more reliable, and more durable aircraft. Henderson felt that the Bendix name had a magic ring to it and meant speed, reliability, and progress. Sponsoring the race would go a long way toward promoting Bendix aviation products.

Henderson showed Bendix a preliminary drawing of a proposed trophy for the race. Vincent Bendix said he thought the trophy was just a standard loving cup and told Henderson to come back and see him when he'd designed a better trophy.[1]

For a much more comprehensive history of the Bendix Trophy Race see Don Dwiggins' book titled, They Flew the Bendix Race footnoted below.

[1]*Don Dwiggins, They Flew the Bendix Race, J.B. Lippincott Company, New York, 1965, p.14-15*

Vincent Bendix Trophy, Photo National Air and Space Museum, Donated by the Clifford W. Henderson Family Trust

Henderson commissioned a new trophy that was sculpted and cast by artist Walter A. Sinz.

Vincent Bendix must have liked the new 100-pound bronze trophy because he agreed to sponsor the cross-country race with a contribution of $15,000 that was to be matched by the Cleveland Air Race Commission.

Laird Super Solution replica at Fantasy of Flight, photo Valder137, CC BY 2.0 https://creativecommons.org/licenses/by/2.0, via Wikimedia Commons https://upload.wikimedia.org/wikipedia/commons/a/a8/Laird_Super_Solution_RSideFront_FOF_12July2010_%2814403943148%29.jpg

The first Bendix winner was Jimmy Doolittle, flying the Laird Super Solution averaging 223.058 mph during the Bendix Trophy Race in 1931. Henderson's vision to incentivize aircraft designers and builders to strive for more speed and reliability worked. The nature of the long cross country race required reliability to finish at all, and each year saw developments that usually increased the average race speed.

Mr. Mulligan in 1935, photo Wikipedia

The 1935 Bendix featured the first (and only) racer designed specifically for this race. Designed by famed aeronautical engineer Benny Howard, the sleek high-winged monoplane was designated the Howard DGA-6. The nickname "Mr. Mulligan" is better known.

Howard's philosophy was for Mr. Mulligan to fly the entire Bendix race nonstop at high altitudes. Eliminating fuel stops that all other previous Bendix racers had to make saved a great deal of time, and was proven a successful strategy when Howard finished first in 1935, ahead of Roscoe Turner. Howard even went on to win the Thompson closed-course pylon race the next day.

Jacqueline Cochran, with Seversky AP-7 that she piloted to victory in the 1938 Bendix Race. Photo National WASP WWII Museum https://www.waspmuseum.org/avenger-news/part-ii-nancy-jackie-before-the-wasp-jacqueline-cochran-by-julia-lauria-blum/

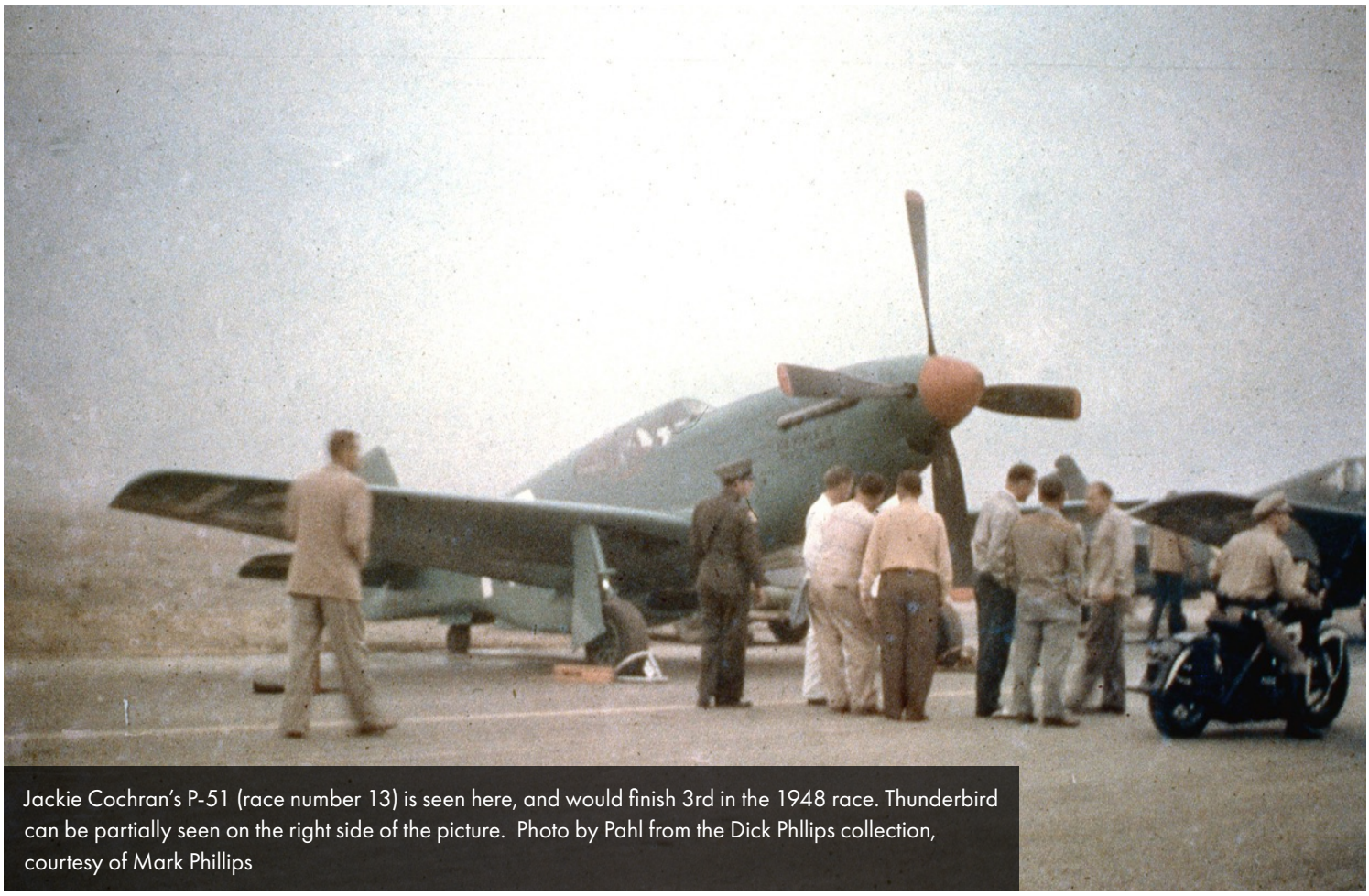
The three Bendix races between 1937 and the shutdown of air racing during WWII were won by Seversky SEV-2S, better known as the P-35 in the military. Among the winners was Jackie Cochran in 1938 in a Seversky AP-7 which was an improved civilian version of the P-35. Jackie averaged 249.774 mph. She was to figure in Thunderbird's history later on.

The post-war races took advantage of the accelerated improvements in aircraft design and technology that were the result of the all-out war effort. All the propellor division Bendix winners from 1946, when the race resumed, through the last propellor division race in 1949 were P-51 Mustangs. Paul Mantz won three consecutive races in 1946, 47, and 48. Thunderbird and Joe DeBona took the 1949 Bendix with a record speed of 470.136 mph which still stands, since it was the final Bendix race with a propellor division.

This photo of Thunderbird was taken at the 1948 Bendix race. Notice that the rudder does not carry the yellow checkerboard paint, and there is no yellow stripe on the forward fuselage or yellow paint on the spinner. Next to Thunderbird on the left is the wing tip of Jackie Cochran's P-51 (race number 13. Photo by Pahl from the Dick Phllips collection, courtesy of Mark Phillips

On the right side of the photo is one of the Mustangs sponsored by oilman Glenn McCarthy. It is "Buttonpuss", named using pilot Ed Lunken's nickname for his wife. Edmund Lunken finished in 4th place with an average speed of 441.594mph.

McCarthy's Buttonpuss with Thunderbird visible in the background. Photo by Pahl from the Dick Phillips collection, courtesy of Mark Phillips



Jackie Cochran's P-51 (race number 13) is seen here, and would finish 3rd in the 1948 race. Thunderbird can be partially seen on the right side of the picture. Photo by Pahl from the Dick Phllips collection, courtesy of Mark Phillips

In the first color photo, there is an odd-looking device atop Thunderbird's vertical fin.

The unit on the fin shows in this 1948 photo of Thunderbird. photo by Chalmers Johnson, courtesy of Tim Weinschenker collection.

The odd-looking protuberance on the fin is believed to have housed an ADF. It was moved under the wing center section and covered with a fairing for the 1949 race. photo by Chalmers Johnson, courtesy of Tim Weinschenker collection.

From biplanes at 223 mph to Mustangs at 470 mph, the Bendix race showcased the aeronautical engineering progress that took place from 1931 through 1949.

Special thanks to Air Racing Historians Kevin Grantham and Tim Weinschenker, and also to author Mark Phillips for help with photos and proper credits.