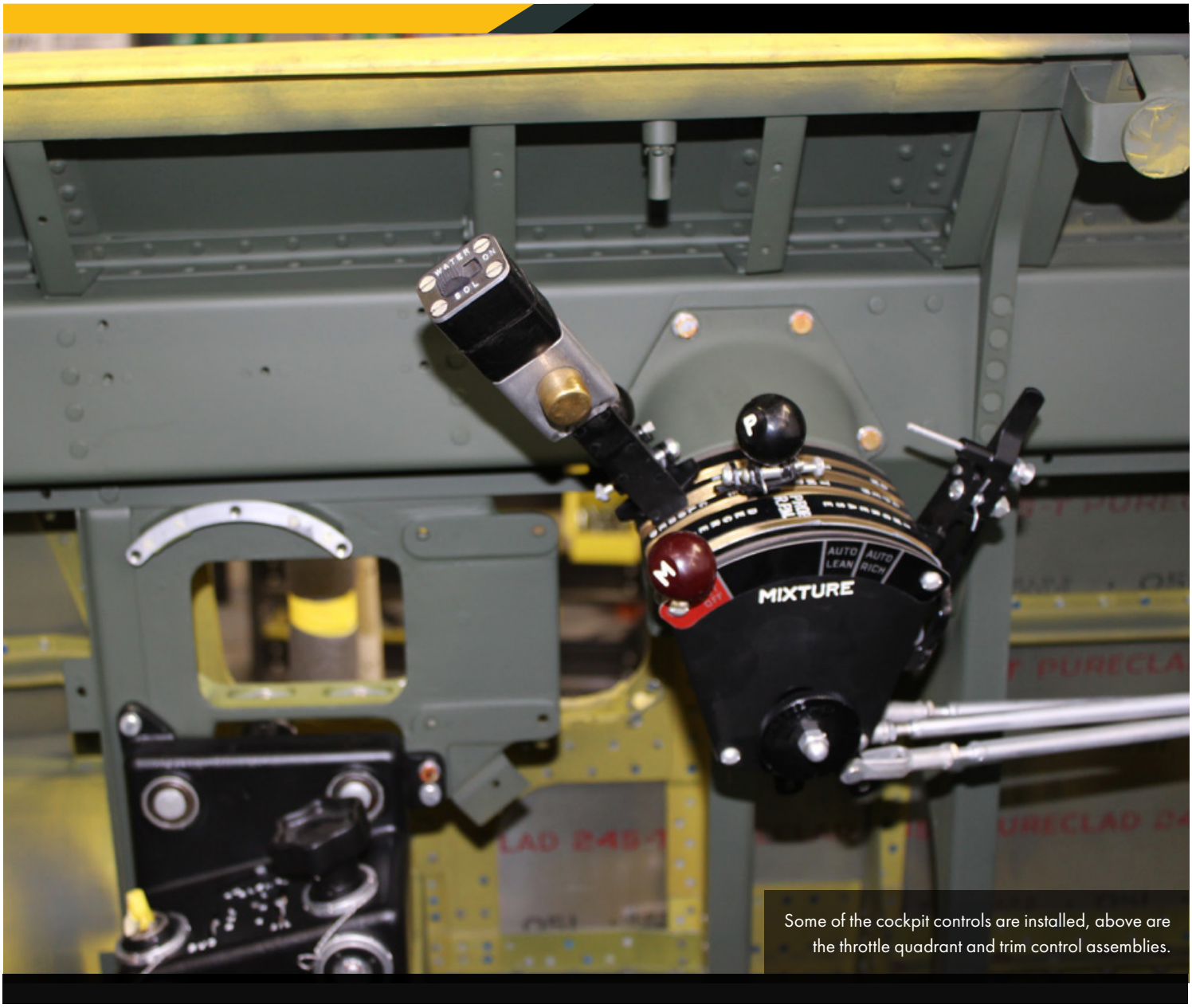
AUG/SEPT

Dakota Territory Air Museum's P-47 Update

by Chuck Cravens

AIRCORPS AVIATION



Some of the cockpit controls are installed, above are the throttle quadrant and trim control assemblies.

DAKOTA TERRITORY AIR MUSEUM

www.dakotaterritoryairmuseum.com

Update

This month some custom paint mixing was done to accurately paint the cockpit interior. Engine control assemblies were also installed and some of the wing rib sections were fitted.

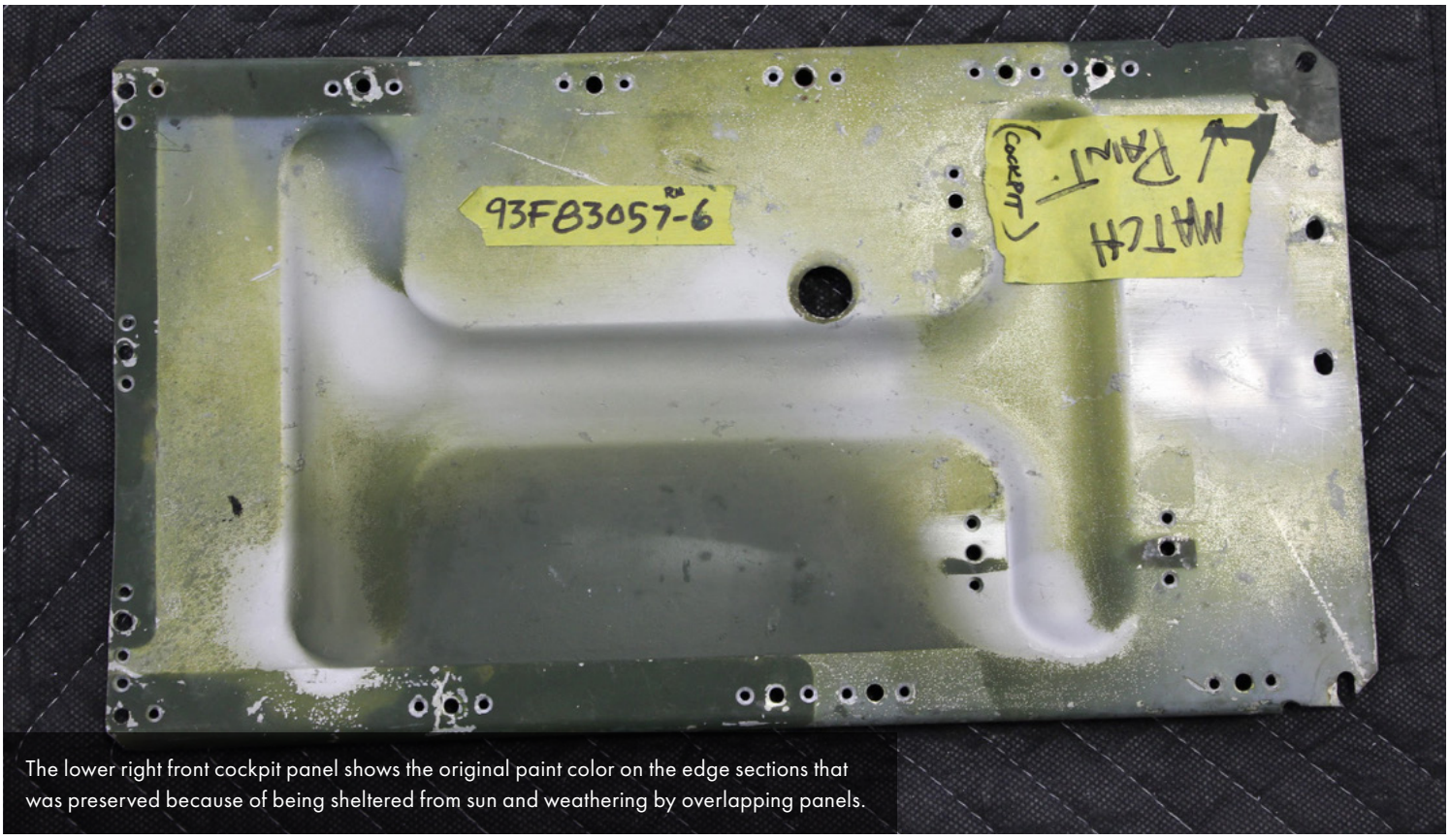
Major General Dewitt Searles, a Southwest Pacific Thunderbolt pilot, signed the main access door of the P-47. His career and accomplishments are highlighted in the history section of this update.

Cockpit Color

One of the challenges in an accurate restoration of a veteran warbird is getting the paint colors right for that specific airplane. Color standards are a start, but they aren't the whole story. The inside of the cockpit on 42-27609 fortunately had a small area of undisturbed paint that had been covered by overlapping parts. It was fortunate because that paint didn't precisely match the color specification called out in the engineering drawings.

The undisturbed paint is on part number 93F83057-6. It is the lower right front cockpit wall, original to our airframe, 42-27609. The panel's importance lies in the paint along the edges.

Along those edges is paint that was covered by overlapping aluminum for 73 years. That green paint held its correct color because it wasn't exposed to sunlight or weathering.



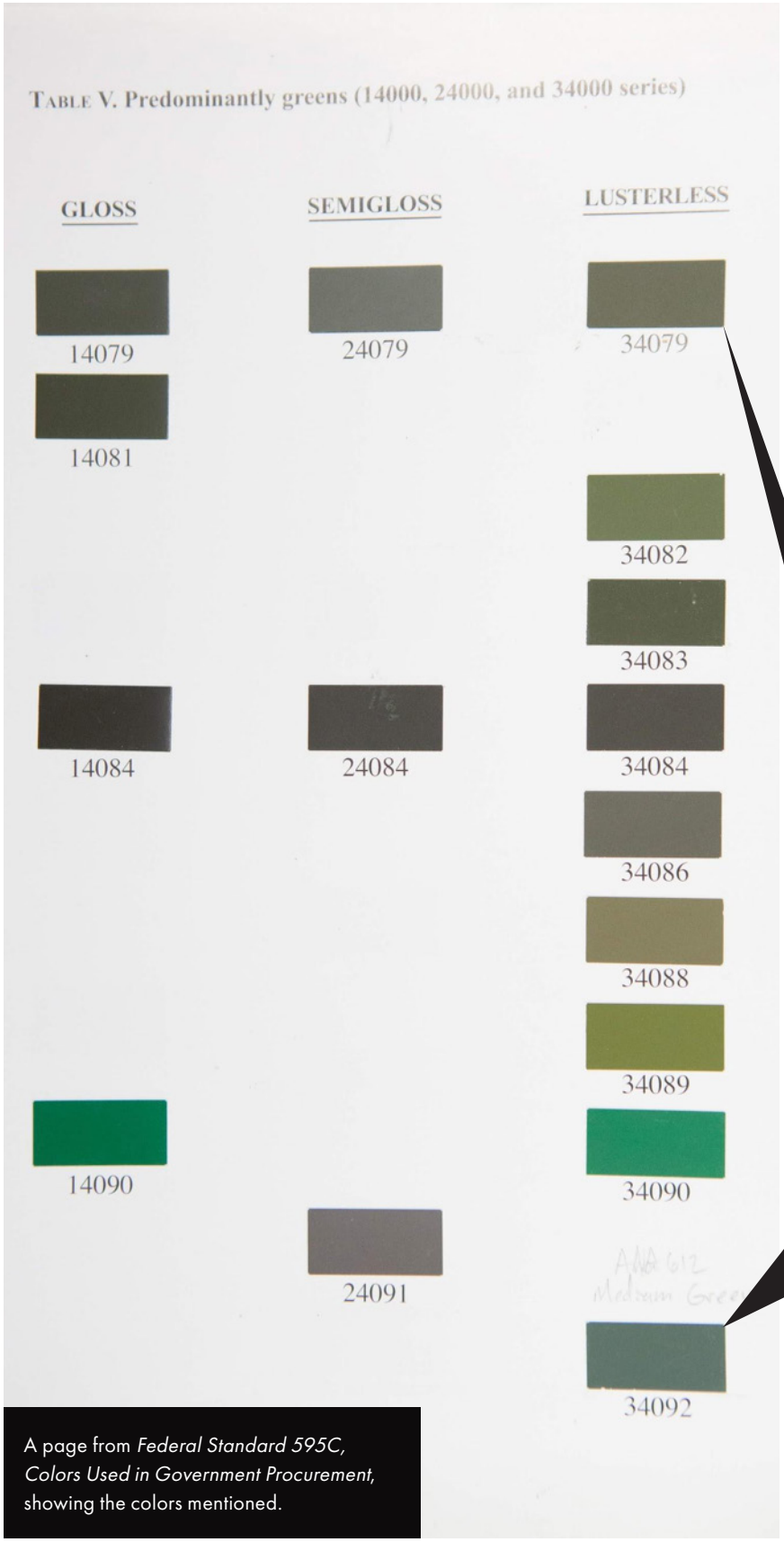
The lower right front cockpit panel shows the original paint color on the edge sections that was preserved because of being sheltered from sun and weathering by overlapping panels.

The 1944 color code specified for the cockpit is ANA 612 Shade #42 (Medium green), or in modern nomenclature, 34092. However, the original color in the sheltered area looked a little more brown than the specified 34092, and ended up being a closer match to 34079 on the Federal Standard 595C chart.

There are many possible reasons why the paint in the Thunderbolt doesn't exactly match the color specified in the engineering drawings, but the most likely one relates to how rapidly P-47s were being produced at Evansville (and Farmingdale) at the time. With hundreds of P-47s rolling out of the factory, niceties like careful and complete shaking of paint likely went by the wayside, so paint from different levels in the original bulk container would dry to a slightly different shade after application.

Dave Moyer, our talented painter, mixed paint to precisely duplicate the color.

A closer view of the surviving color.



A page from *Federal Standard 595C, Colors Used in Government Procurement,* showing the colors mentioned.

This color, 34079, is the closest to the protected color of the edges of the cockpit panel.

Originally specified 612 medium green (34092)

Dave's process involved adding a color, shaking the paint, shooting a small sample panel, and checking the results.

As the process continued, each time there was an addition of color, the paint was shaken to blend it and then the next color was added. This made for a long process, but it ensured that the final color was correct.

This procedure was repeated until Dave was satisfied that he had a perfect match for the original preserved color before he used the resulting paint to paint the interior of the cockpit of the Thunderbolt.

The base paint and scale for mixing the added colors.

Dave pours a little black into the mixture.

The following photos show the color. Note that different lighting angles and intensity make the color appear different in the various photos but the dark green is all the same custom mix to duplicate the original paint from 42-27609.

The original part after receiving an overall coat of color. On the center right side, a small rectangle of the original paint that has been left exposed in order to highlight the color match.

Here is a closer view of the preserved section of original color.

The fuselage has been rolled into the paint booth in this shot.

It is a little bit too long to fit in straight.

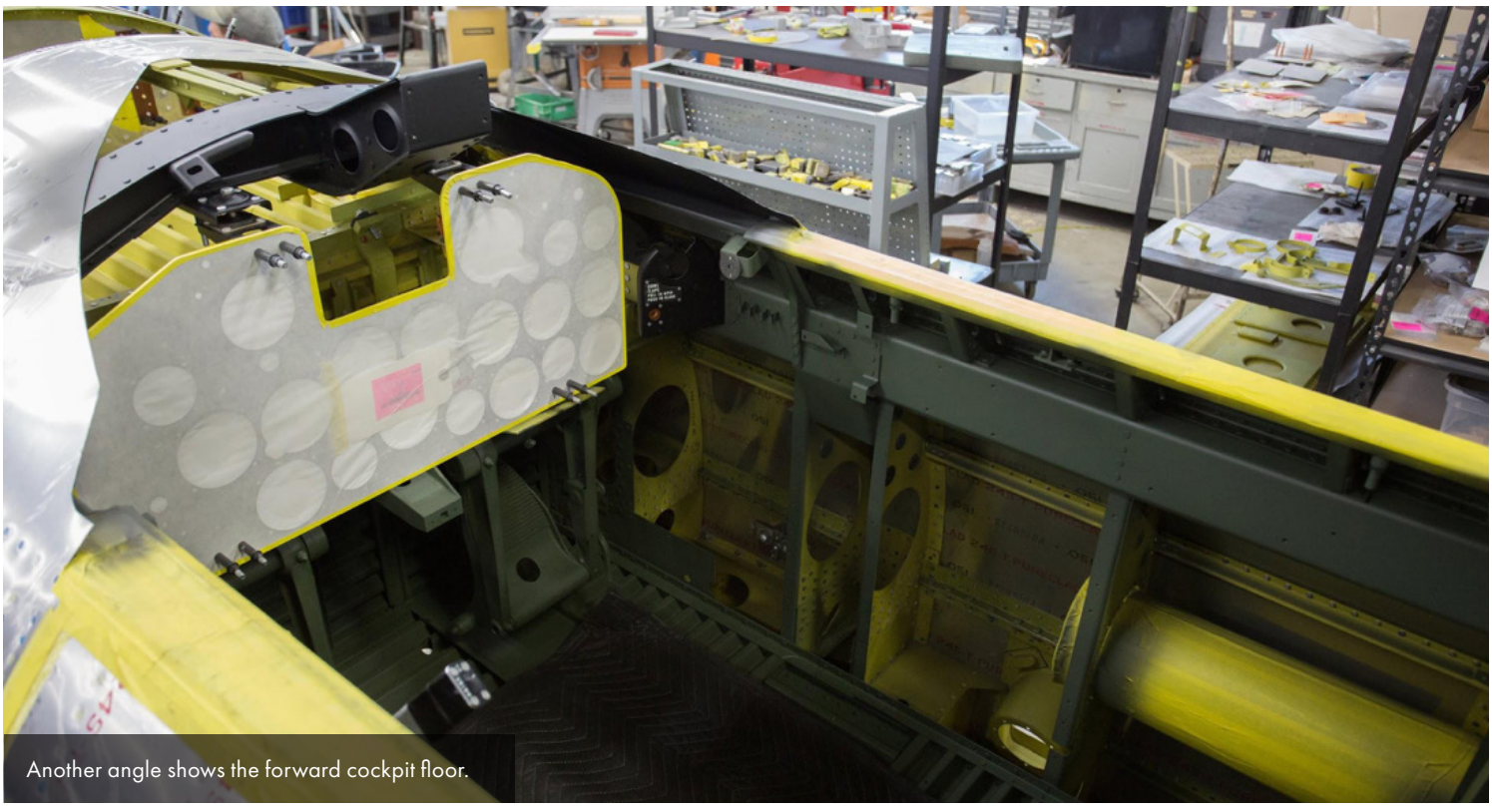
But it did fit the booth when it was angled.

The rollover structure is wearing its final paint.

Cockpit

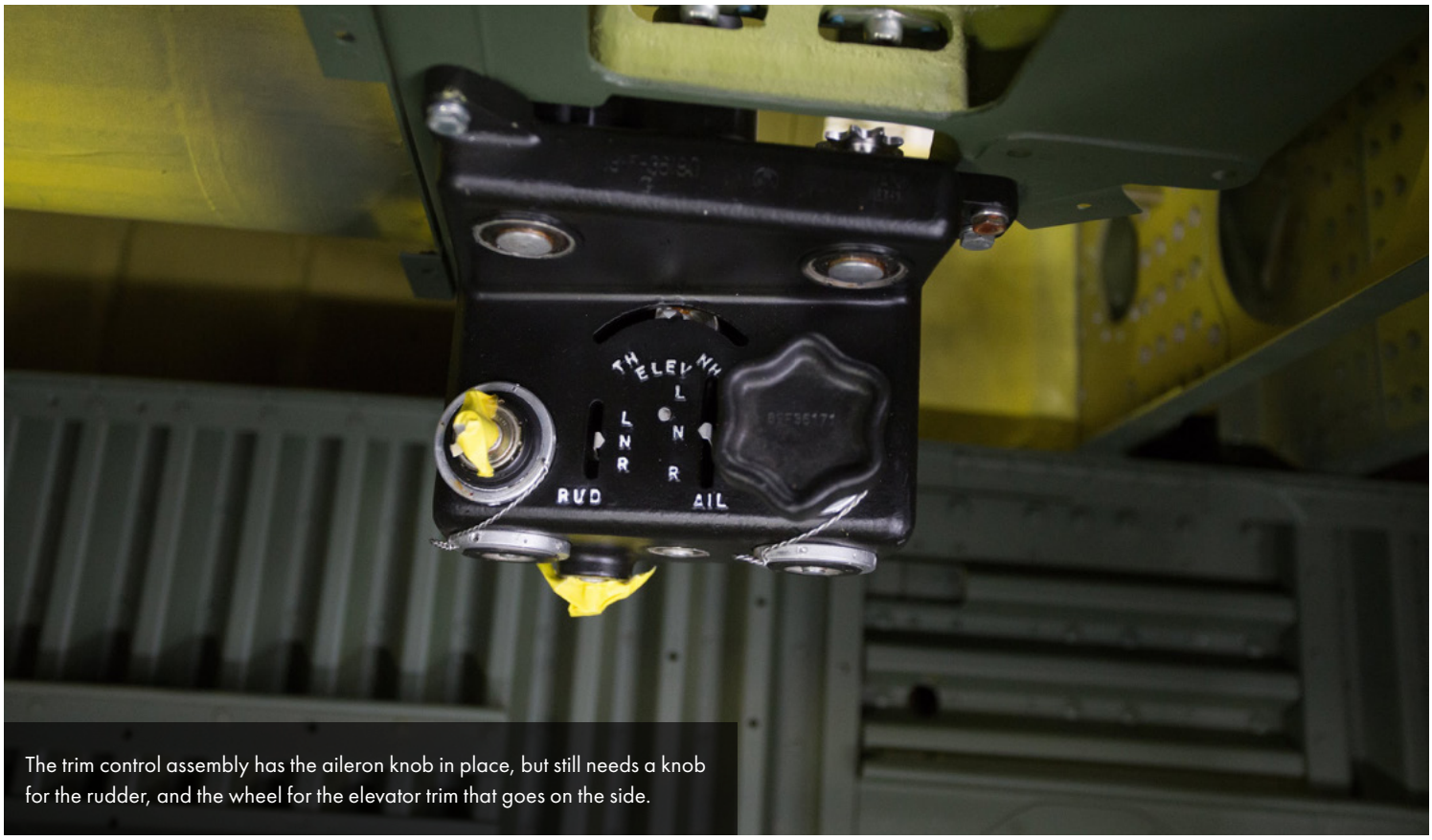
Once the paint was dry in the cockpit, control assemblies and other systems could be installed.

A view from the left side of the cockpit shows what was painted the medium green, and what was covered with yellow masking tape or paper.

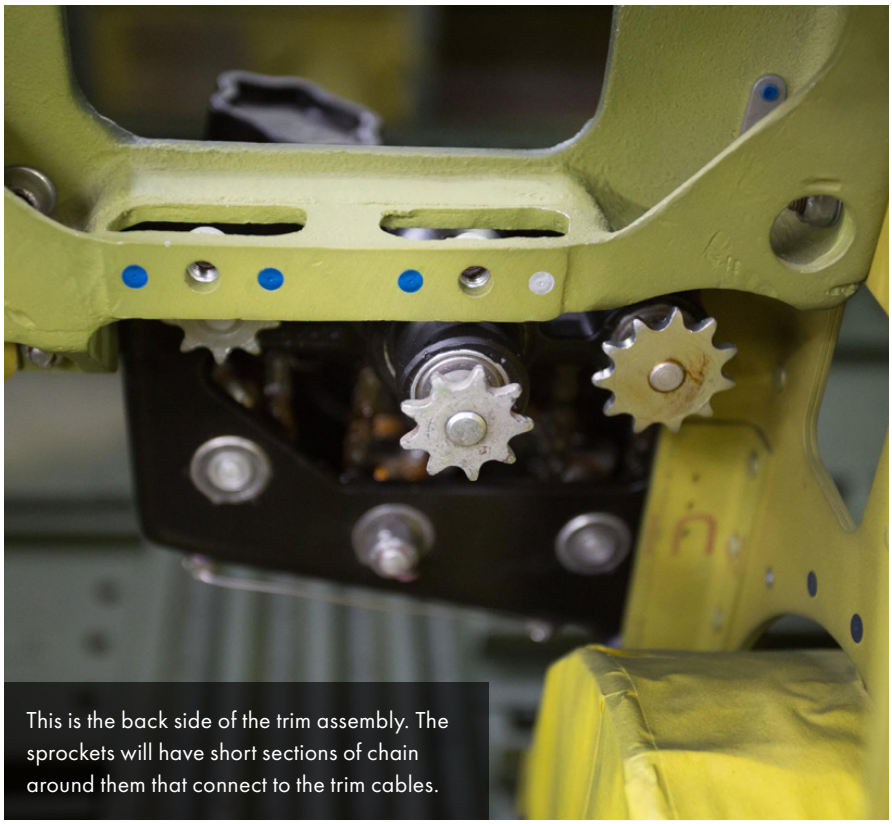


Another angle shows the forward cockpit floor.

In this image we can see the throttle quadrant and trim assemblies and their relative positions.

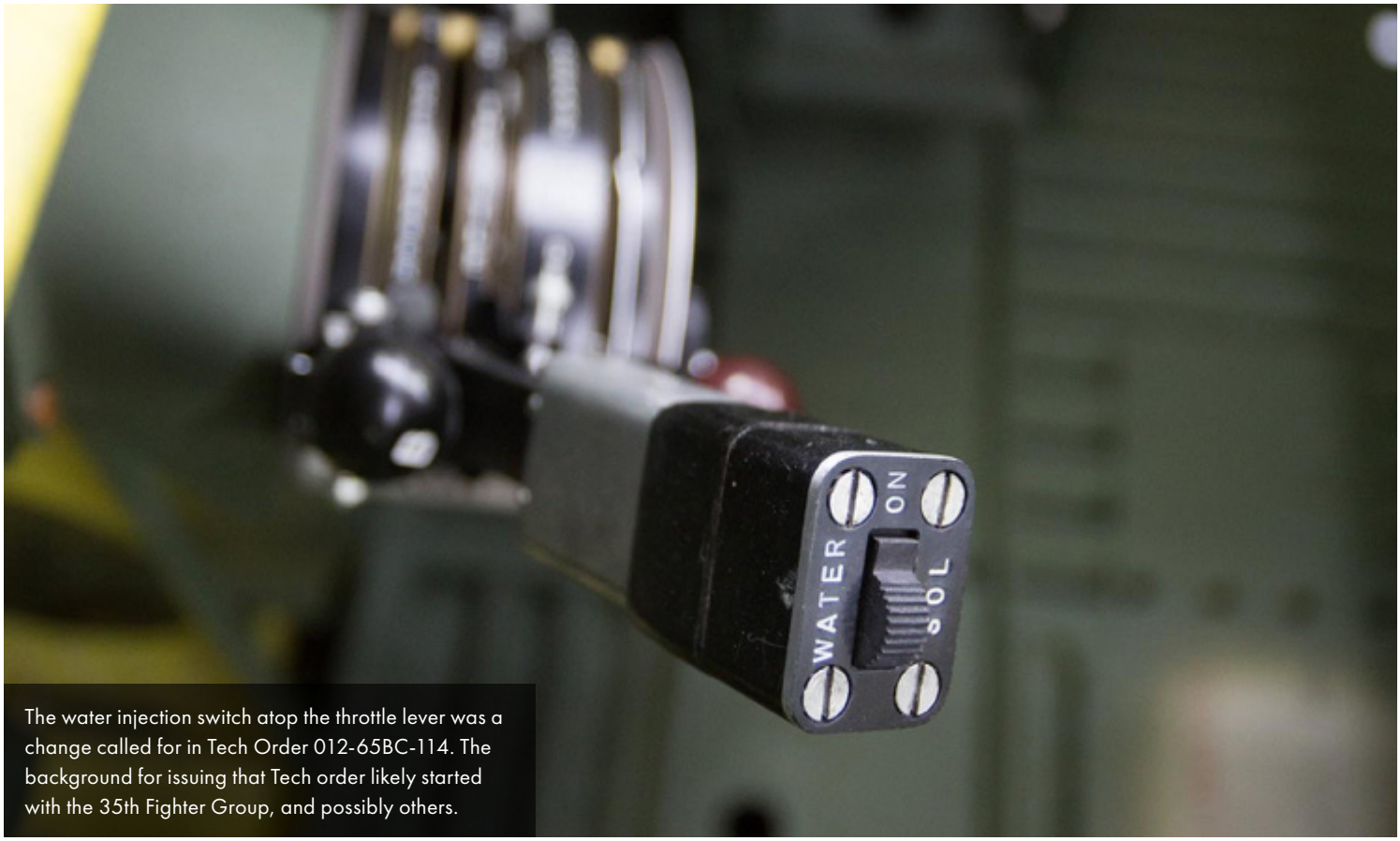


The trim control assembly has the aileron knob in place, but still needs a knob for the rudder, and the wheel for the elevator trim that goes on the side.



This is the back side of the trim assembly. The sprockets will have short sections of chain around them that connect to the trim cables.

The throttle quadrant is nicely labeled. The only control not clear from this angle is the maroon mixture control knob.



The water injection switch atop the throttle lever was a change called for in Tech Order 012-65BC-114. The background for issuing that Tech order likely started with the 35th Fighter Group, and possibly others.

THIRTY NINTH FIGHTER SQUADRON
OFFICE OF THE OPERATIONS OFFICER
APO 713, Unit 1.

July 15, 1944.

SUBJECT: Combat Evaluation Report.

TO : CO, 35th Fighter Group, APO 713, Unit 1. ATTEN: S-3.

1. In accordance with Memorandum 55-10, dated 29 Mar. 45 V Fi. Com, the following report is submitted for period ending July 15, 1944.

a. The P-47-D-23 airplane is equiped with a push button water solenoid switch on top of the throttle. This type of switch is undesirable since it must be depressed during the entire period in which water injection is employed. It is therefore virtually impossible to trim the airplane for the increase in power obtained. A toggle switch as installed on P-47-3 and P-47-4 airplanes is more practical and has been substituted in the airplanes of this Squadron.

b. A toggle switch has been installed in the water pump circuit to prevent continuous operation of the pump. Thus the life of the pump is increased and a means is provided to prevent the water pump from freezing after the system has been run dry.

For the Squadron Commander:

/s/ William L. Urquhart
/t/ WILLIAM L. URQUHART
Capt., AAF,
Operations Officer.

A TRUE COPY:

Russell C. Brizius
RUSSELL C. BRIZIUS
1st Lt., Air Corps,
Adjutant.

The members of the 35th Fighter Group weren't fond of the water injection switch arrangement in their new D-23s, so they did a field modification; documented here.

The new P-47D-23s originally came with a water injection control that was a momentary switch that "must be depressed during the entire period in which water injection is employed."

The 35th group didn't like that arrangement because with one hand on the stick, and the other on the throttle to hold down the water injection switch button, "it is virtually impossible to trim the airplane for the increase in power obtained".

Republic issued Tech order 01-65BC-114 to remedy the water injection control issue on subsequent P-47s. For utility reasons, the updated flashlight-type switch specified in the Tech Order is what will be used on 42-27609.

RESTRICTED

HEADQUARTERS, ARMY AIR FORCES
WASHINGTON 25, D. C.

TECHNICAL ORDER
NO. ~~01-65BC-114~~
1F-47D-209
19 September 1944

AIRCRAFT AND MAINTENANCE PARTS

REPUBLIC—INSTALLATION OF FLASHLIGHT TYPE WATER INJECTION SWITCH ON TOP OF QUADRANT THROTTLE LEVER—P-47D

NOTE As prescribed in T.O. No. 00-20A, appropriate reference to this Technical Order will be entered on AAF Forms 60-A for the aircraft affected. The work directed herein will be accomplished as soon as possible and not later than the next 100-hour inspection period by service activities with the aid of base maintenance facilities, if necessary. Spare quadrants in stock will be modified in accordance with the instructions contained in paragraph 2, prior to issue.

1. PURPOSE.

To provide a water injection control switch which can be used either as a momentary switch or as a fixed position switch, a flashlight type actuator will be installed over the momentary water injection switch, on the following airplanes in accordance with the instructions contained in paragraph 2.

MODEL	AF SERIAL NOS.
P-47D-21-RE, -22-RE, -25-RE	42-25323 to 42-26773 inclusive
P-47D-21-RA, -23-RA	43-25441 to 43-25753 inclusive
P-47D-23-RA, -26-RA	42-27389 to 42-28438 inclusive
P-47D-28-RA	42-28439 to 42-28738 inclusive

Model P-47D-27-RE airplane, AF No. 42-26774 and subsequent, and model P-47D-28-RA airplane, AF No. 42-28739 and subsequent, will include this change by the contractor prior to delivery.

2. MODIFICATION.

The instructions for accomplishing this change, as contained in Republic Service Bulletin 47-198, dated 15 June 1944, and supplement No. 1, dated 31 July 1944, are as follows:

a. Remove cover around momentary switch on top of quadrant throttle lever by removing the four screws holding it in place.

b. Remove spacer shown on figure 1.

c. Assemble torque ring, part No. SK-93-6004-1, base, part No. SK-93-6002-1, actuator, part No. SK-93-6001-1, and plate, part No. SK-93-6003-1, on top of throttle lever as shown in figure 1. Fasten these parts in place with four screws, part No. AN505-6-32, and four lock washers, part No. AN936-C6.

NOTE It may be found that the switch does not operate correctly. This is caused by variations in the height of the momentary switch. If the switch does not go on when the flashlight button is pressed, cut enough off the spacer so contact will be obtained. Also, if the switch is on all the time, add a shim under the spacer so that the correct height will be obtained.

3. SUPPLY INFORMATION.

a. The following parts are required per airplane to accomplish this change. These parts are furnished as complete kits for initial installation and will be requisitioned in accordance with T.O. No. 00-35A-15.

QTY	STOCK NO.	PART NO.	NOMENCLATURE	CLASS	SOURCE
1	1300TO-01-65BC114		KIT, "Installation of Flashlight Type Water Injection Switch on Top of Quadrant Throttle Lever - P-47D," consisting of the following parts:	15	AF Stock
1		SK-93-6001-1	Actuator	01-N	
1		SK-93-6002-1	Base	01-N	
1		SK-93-6003-1	Plate	01-N	
1		SK-93-6004-1	Torque Ring	01-N	
4		AN505-6-32	Screw - Machine steel flathead	29	
4		AN936-C6	Washer - Lock steel countersunk	29	

b. Parts required for maintenance after initial installation or for modification of spares in stock will be requisitioned as a complete switch assembly from the class and stock number as indicated.

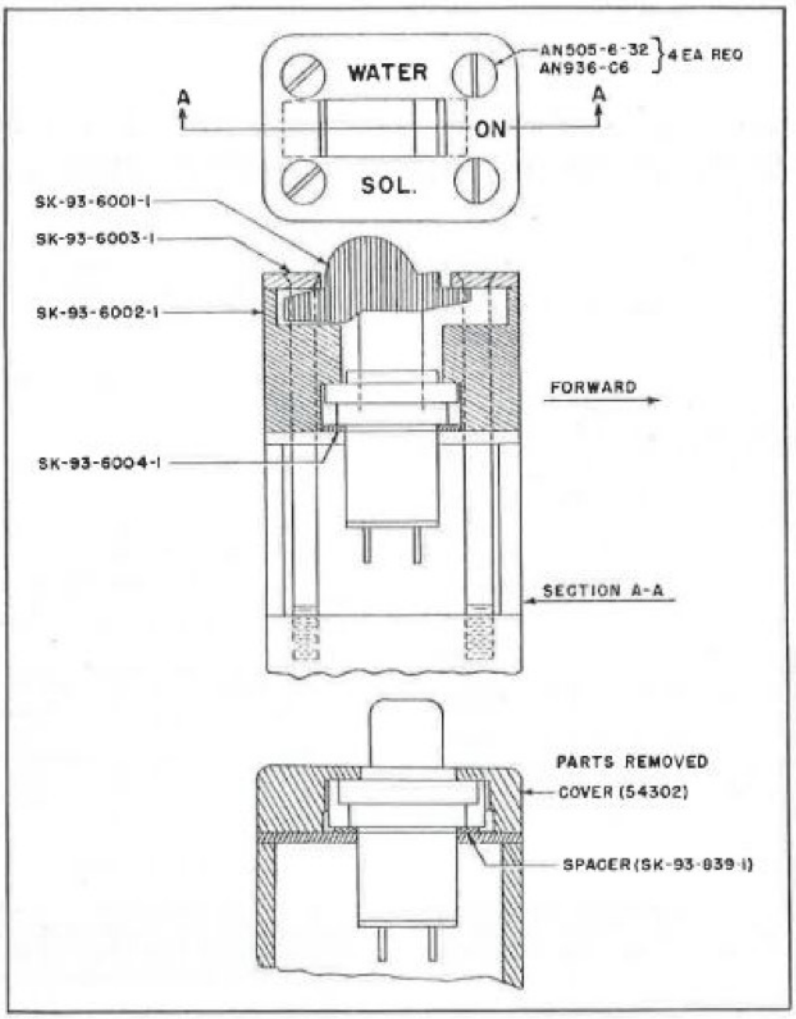
QTY	STOCK NO.	PART NO.	NOMENCLATURE	CLASS	SOURCE
1	4500-444124		Switch Assembly (Aero Supply Co.)	03-J	AF Stock
4		AN505-6-32	Screw - Machine steel, flathead	29	AF Stock
4		AN936-C6	Washer - Lock steel countersunk	29	AF Stock

Compliance with these instructions is MANDATORY within the continental United States. Within theaters of operation, compliance will be at the discretion of Task Force Commanders concerned.

Technical Order 01-65BC-114, specifying the new flashlight-type switch for control of the water injection.

RESTRICTED
T. O. No. 01-65BC-114

Figure 1



c. The following parts removed in accordance with the preceding instructions will be returned to stock if reparable or serviceable.

QTY	PART NO.	NOMENCLATURE	CLASS
1	54302	Cover	01-N
1	SK-93-839-1	Spacer	01-N
4	AN505-6-18	Screws	29

d. One complete kit of parts packed for shipment measures 4 x 4 x 4 inches and weighs approximately 1-1/2 pounds.

4. WEIGHT CHANGE.

The weight change effected by this modification is negligible.

By Command of General ARNOLD:

Prepared by Miscellaneous
Equipment Section,
Maintenance Div,
Hq, ATSC.

BENNETT E. MEYERS
Major General, U.S.A.
Deputy Director
Air Technical Service Command

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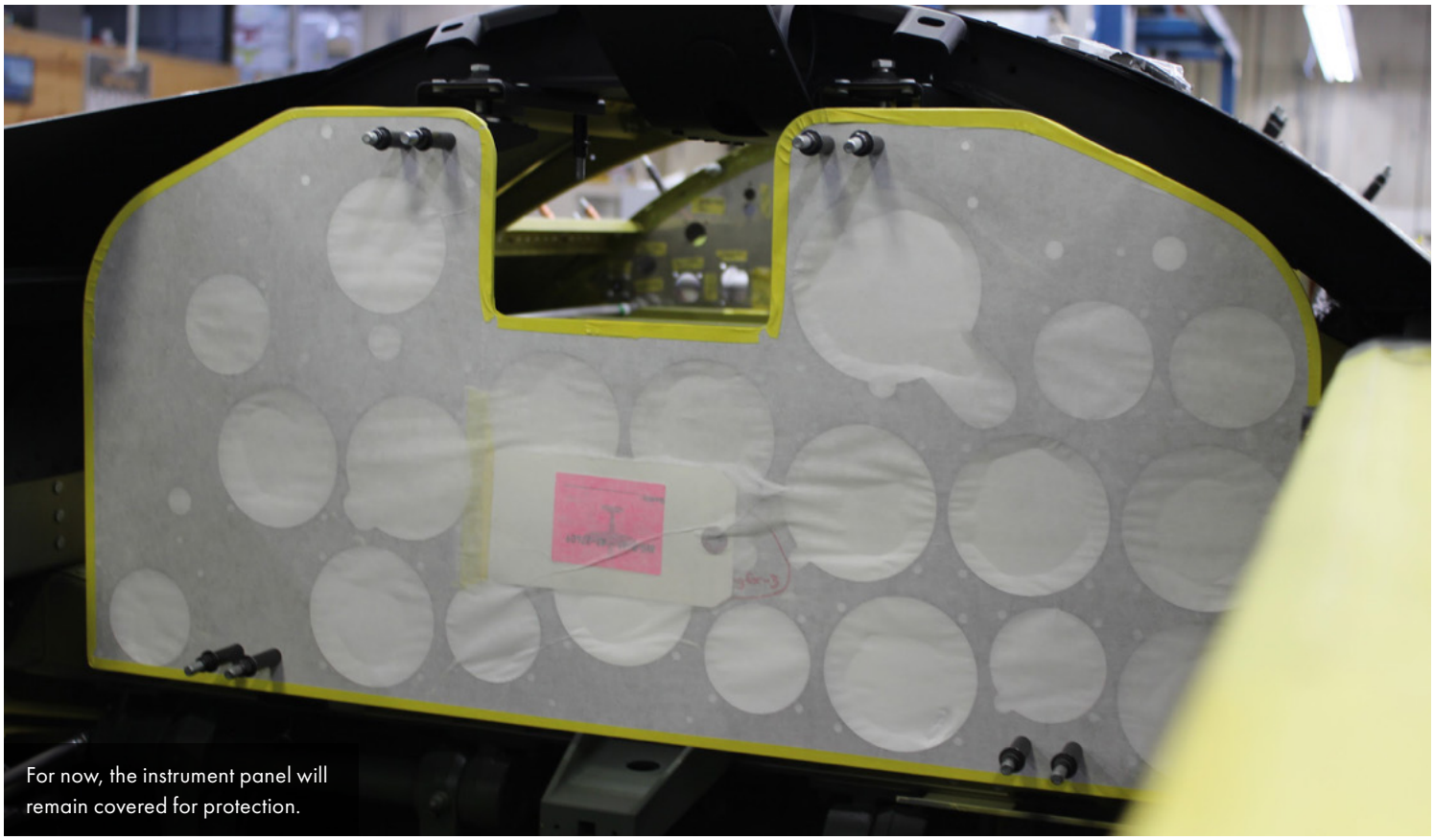
Technical Order 01-65BC-114, specifying the new flashlight-type switch for control of the water injection.

The primer and cowl flap control mount on this bracket.

The gunsight mount sits just above the instrument panel.



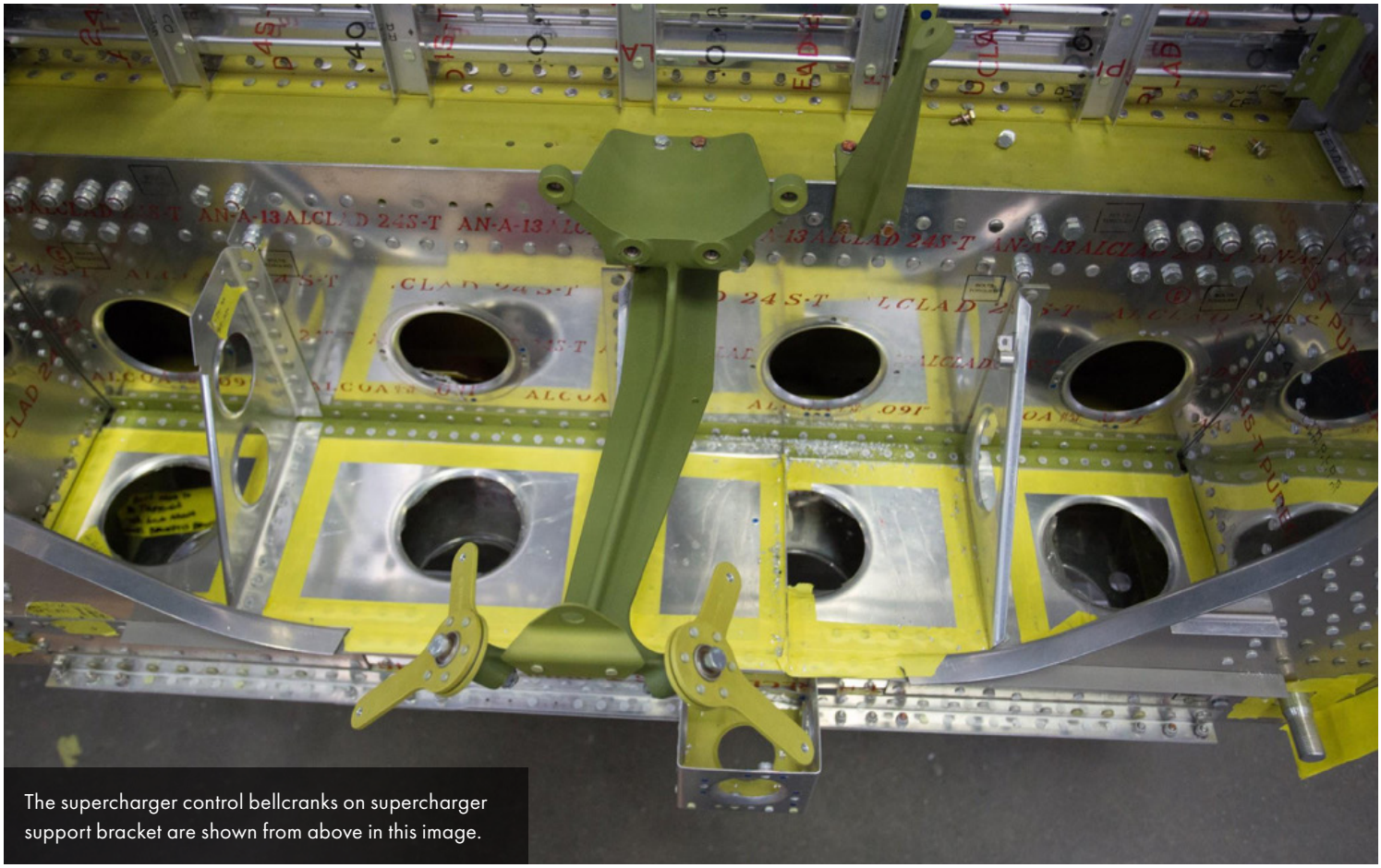
For now, the instrument panel will remain covered for protection.

The forward floor and rudder pedals in their medium green paint.

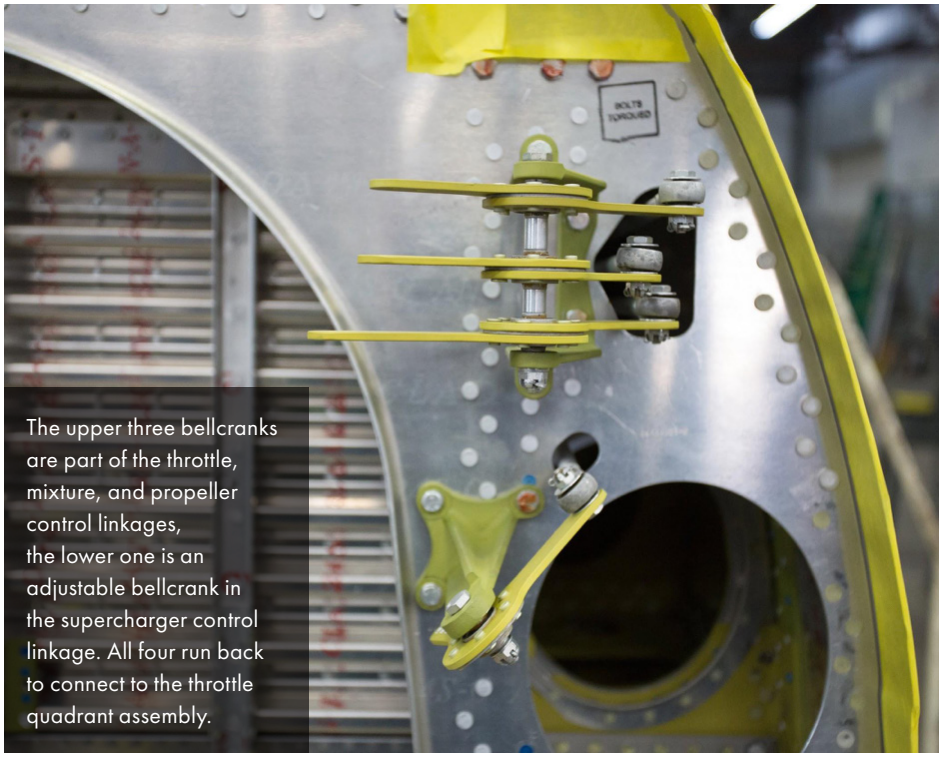
Fuselage Systems

Here is another view of the fuselage from the rear.

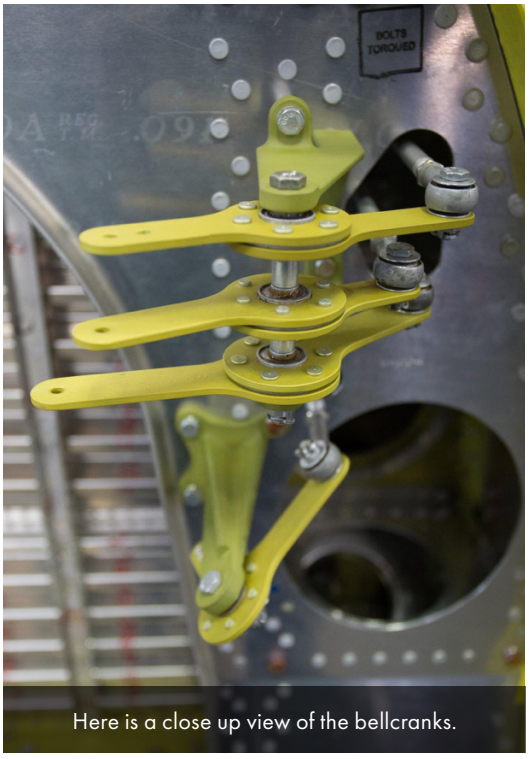
The bellcranks on the end of the supercharger control (part number 89P64160) are part of the complex system of engine control linkages required for the P-47.



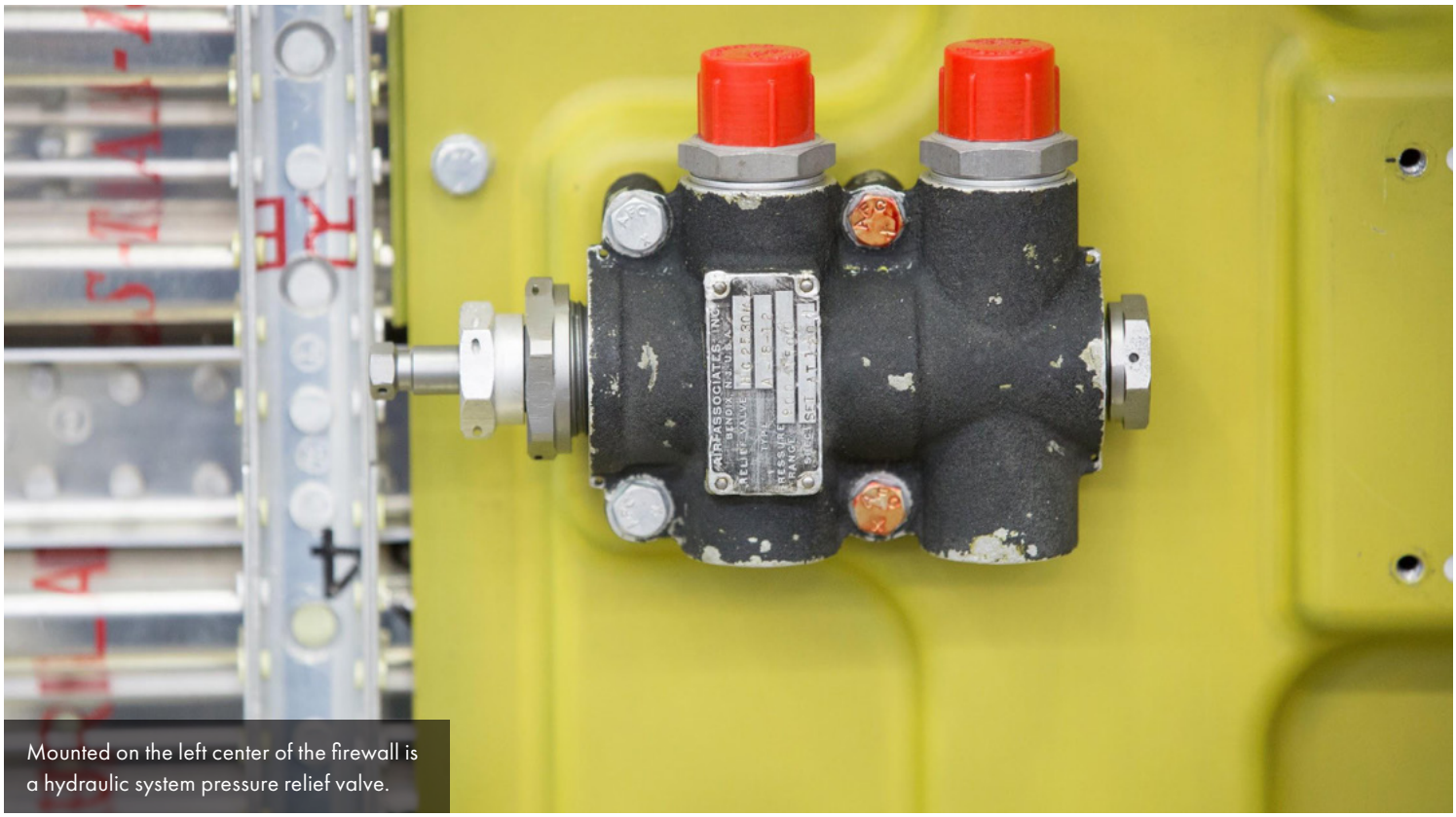
The supercharger control bellcranks on supercharger support bracket are shown from above in this image.



The upper three bellcranks are part of the throttle, mixture, and propeller control linkages, the lower one is an adjustable bellcrank in the supercharger control linkage. All four run back to connect to the throttle quadrant assembly.



Here is a close up view of the bellcranks.



Mounted on the left center of the firewall is a hydraulic system pressure relief valve.

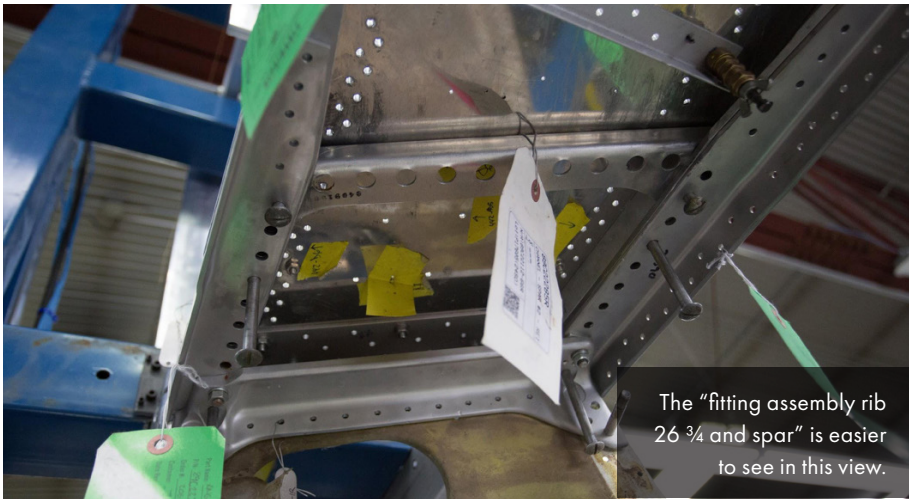
Just below the hydraulic pressure relief valve is the hydraulic system filter.

Wings

More visible progress on the wing assembly happened this month than in recent months, as some of the rib sections were fitted.

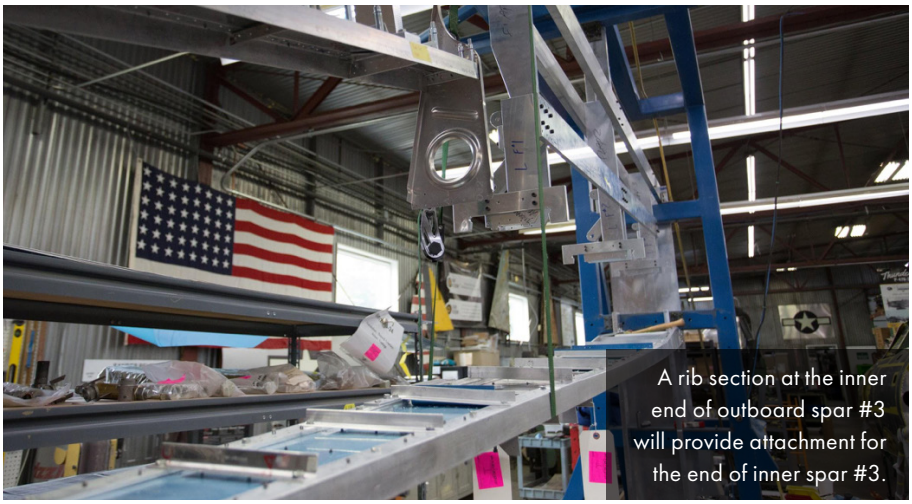
This photo shows a good example of how original parts are used as templates and for checking assembly.

An original rib is in place to verify if the rivet holes line up (it will be removed later). The angles on each side of the spar, and the part running from the top to bottom along the base of the spar, called the " fitting assembly rib 26 ¾ and spar" ; are original parts that were extensively examined, tested and found to be airworthy.



The "fitting assembly rib 26 ¾ and spar" is easier to see in this view.

Most of the angles on the front and back of spar #2 are original parts.



A rib section at the inner end of outboard spar #3 will provide attachment for the end of inner spar #3.

In this view, both inboard and outboard spar #3 sections show, as well as the straight continuous spar #2. The outboard wing rib sections between spar #2 and spar #3 are in place, along with some of the inboard ribs.

These are inboard ribs sections between spar 2 and 3 in the wing root area.

Major General Dewitt Searles

Lt. Dewitt Searles in one of his P-47s, a D-21 RE, in the Southwest Pacific.

It has been a great honor to correspond with Major General Dewitt Searles during our restoration of 42-27609.

Many thanks to Terry Popravak, author (with James Curran) of the fine book *Check Six, a Thunderbolt Pilot's War Across the Pacific*[1], for facilitating this connection. Major General Searles very recently celebrated his 99th birthday.

Here is what Maj. Gen. Searles had to say about the P-47 in an email to me:

"The P-47 was the sturdiest and most stable propeller driven aircraft that I have ever flown. It had an almost unlimited diving speed. I don't recall a single incident of one breaking up in flight because of aerodynamic stress. And it could absorb more hits by enemy fighters or ground fire, and keep flying, than any other fighter plane that I know of."

[1] Jim Curran and Terrence Popravak Check SixI: A Thunderbolt Pilot's War Across the Pacific (Havertown, PA, Casemate Publishers, 2015)

Biographical Information:

Dewitt Richard Searles was born on August 7, 1920 in Birmingham, Alabama, to Dewitt Richard and Miriam (Hostetler) Searles. His father died when Dewitt was 2 years old. Miriam Searles raised her son as a single mother in addition to contending with the significant challenges of the great depression.

Dewitt attended elementary and high school in Birmingham until his mother found a job as the school nurse at the Bolles School in Jacksonville Florida. After graduation from the Bolles School in 1939, he attended the College of William and Mary until 1941.

In the depression years, money for college was a real problem, especially for a single parent family. After two years at William and Mary, Dewitt enlisted in the aviation cadet program, and completed Army Air Force flying school training in 1943 with a commission as a second lieutenant, and his pilot wings.

During World War II, Lt. Searles served with the Far East Air Forces in the Pacific Theater of Operations.

Lt. Searles with his P-47, Little Chum.

Lt. Searles was assigned to the 348th Fighter Group, 342nd Squadron. Later he was assigned to the newly formed 460th Fighter Squadron, also part of the 348th Fighter Group. During World War II, Dewitt flew 269 combat missions against the Japanese. He is credited with shooting down three Japanese planes and, completed a total of 680 combat hours in P-47 Thunderbolts and P-51 Mustangs over New Guinea and the Philippines.

Major General Searles was kind enough to send me written summary of his war experiences which I will reproduce below in his words:

"A BRIEF SUMMARY OF THE WORLD WAR II EXPERIENCES OF DEWITT R. SEARLES, A FIGHTER PILOT, IN THE UNITED STATES ARMY AIR CORPS DURING THE 1943-45 TIME PERIOD."

In February 1941, with flying school completed, I began an accelerated training course in the combat aircraft I would fly when assigned to a unit overseas. It was my great good fortune to be sent to Dale Mabry Army Airfield, Tallahassee, Florida, to begin training in the Republic P-47 Thunderbolt. Nicknamed the "Jug," the P-47 was the biggest, most powerful and arguably the best multi-purpose fighter aircraft employed in World War II. After completing transition training in July we traveled by train to Hamilton Field, Califomia for further deployment to the Southwest Pacific Area, and assignment to the recently formed 348th Fighter Group commanded by Col. Neel E. Kearby, soon to become a leading fighter ace and recipient of the Congressional Medal of Honor.

I was assigned to the Group's 342nd Fighter Squadron and flown across the Pacific in the bomb bay of a modified B-24 bomber. We departed San Francisco and touched down at Hawaii, Canton Island, and on into the air base at Townsville, Australia where our aircraft awaited us - in crates. So our first mission was to uncrate the aircraft, put them together, test fly them, and then head across the Coral Sea to an air strip 5 miles from Port Moresby, New Guinea.

There we lived in canvas communities with tents on the bare ground for just about everything: sleeping, eating, supplies, maintenance and operations, flight line alert shack, field hospital, recreation, and even privies. Purified drinking water was delivered in water trailers and dispensed from huge canvas "lister" bags suspended from six-foot high tripods.

Lt. Searles on the wing of Little Chum near the four left wing .50 caliber machine guns.

Our two greatest and most lethal challenges during my 22 month tour in New Guinea and the Philippines were the weather and mosquitoes. We lost more to them than we did to the Japanese. Just about every fighter pilot who flew in that area had a bad weather story to tell. The reason is that we had received little or no instrument flying training in any aircraft before being shipped overseas. "Needle, ball and airspeed" was about it, and that wouldn't hack it in an area famous for massive, towering cumulus clouds and torrential rains. The worst weather experience for the Fifth Air Force - and perhaps the worst in aviation history - was on 16 April 1944: "Black Sunday." On that one day we lost 37 aircraft to weather or weather related causes including: A-20's. B-25's, P-38's, B-24's, plus a P-39, a P-47, one F-5A, and one F-7A. To my knowledge there has never been a comparable one-day, noncombat, military aviation loss.

As for mosquitoes, they were our constant companions. They brought us Malaria and Dengue Fever. We fought them with Atabrine, DDT and mosquito nets. Daily Atabrine tablets turned the skin and the whites of the eyes yellow. DDT was the most effective and widely used killer/repellent but it came with harmful side effects, and mosquito nets were essential for a good night's sleep. Used religiously, all three kept most of us fever free but mosquitoes got to enough of us to keep the hospital tent busy. DDT was banned for use in the United States, and in the military, in 1972, but it kept a lot of us going some 4O years ago in New Guinea'.

Food was the third thing that we found a little discouraging: powdered things like milk and eggs; canned things like C-rations and spam; dehydrated things like lemonade and coffee; and experimental things like tropical butter that wouldn't spread or melt and that stuck to the roof of your mouth. And the lack of things like fresh fruit and vegetables added to our dietary problems. All of which points toward the thing we enjoyed most: combat flying.

The Jug was a devastating combat machine: eight .50 calibre machine guns, a 2000 horsepower supercharged engine with a four bladed prop; an unmatched high altitude capability that enabled us to gain speed while diving down into a fight instead of losing speed climbing up into one. We flew with confidence that if we used our heads we could survive just about anything that the Japs had to offer. And, surprisingly, was also the best fighter bomber in either theater of the war. We could easily handle a 100O pound bomb load. A favorite configuration was two 500 pound bombs, belly tank, and a full load of .50 calibre ammo. Jettison the tank, bomb the target and then follow up with a strafing attack more deadly than any other fighter plane could deliver.

The role of the P-47 steadily evolved as we moved up the northeastern coast of New Guinea and into the Philippines. It changed from being an all purpose air-to-air/air to ground/combat patrol weapon to, primarily, a ground attack machine. Bombing and strafing became our principle mission. Either the Japanese were running out of aircraft or they began pulling them out of the theater for defense against an anticipated attack on the homeland by our combined military forces. In any event, air-to-air engagements declined sharply. Toward the end, we concentrated almost exclusively on air to ground attacks, in support with our ground forces, with bombs, napalm, and machine gun fire. As an illustrative statistic: In May 1945, the 460th Fighter squadron dropped more than 2000 tons of bombs, a record for bomb tonnage dropped by any fighter squadron in the war.

All the while we were moving rapidly up the northeast coast of New Guinea toward Douglas MacArthur's initial objective, the Philippines. He meant it when he said: "I shall

Lt. Searles sits astride the rear fuselage of Little Chum.

return!" He did. And he did it with an economy of force unmatched by any U.S. General since Winfield Scott in the 1846-48 War with Mexico.

From Brisbane, Australia he moved us across the Coral Sea to Port Moresby and then some 300 miles up the northeastern coast of New Guinea; leapfrogging from one air strip to the next: Moresby, Finschafen, Saidor, Wadke Island, Biak, and Noemfoor. In doing so, he left nearly a quarter million stranded and starving Japanese troops in his wake. Never once were the Japanese able to force him into a murderous man-to-man battle in the jungle. Those battles came after October 20, 1944 when MacArthur waded ashore at Leyte Island and established a foothold in the Philippines. Twenty one days later we landed the first contingent of P-47's on Leyte's short, unfinished Tacloban air strip. The engineers were still laying pierced steel planking to extend the runway. Another 1000 feet had to be laid before it was fully operational. We arrived at Tacloban on the east side of Leyte at the same time that a Japanese naval task force sailed into Ormoc Bay on the west side of the island. The Japanese convoy composed of fully loaded troop ships, protected by destroyers, was

intended to reinforce troops in place and then to drive us off the island. The effort failed. We attacked the convoy the same day, along with a squadron of B-25's from the 38th Bomb Group, and continued the attacks for several days afterwards. All the troop ships were sunk or ran aground and few, if any, of the men on board reached the fighting front.

We continued to move northward in support of the fight to drive the Japanese from the Philippines. On December 14th we moved to Tanauan air strip on Leyte and in February, 1945 we occupied San Marcelina air strlp, our first base on the main island of Luzon.

January 1945 was a particularly important month for me, personally, when, as a 24 year old 1st Lieutenant, I was given command of the 460th Fighter Squadron, a 300 man fighting unit equipped with 24 of the finest fighter aircraft ever built. Shortly afterwards I was promoted to Captain.

March 1945 also stands out in our history as we began transition from the gallant old "Jug" to the North American P-51 "Mustang." To this day the arguments continue as to which was the better aircraft. Both were superb but my heart remains with the P-47.

May 1945 saw us move into the airstrip at Floridablanca, still further north, which enabled us to strike off-island targets as far away as Taiwan, as well as continuing our attacks on remaining targets on Luzon.

May was also my last month of combat duty in World War ll. On 3 May 1945, I received orders assigning me

Official USAF photo of Major General Dewitt Searles, taken later in his career.

to the 24th Class at the Army Command and General Staff School, Fort Leavenworth, Kansas. While on leave, after completing the course at Leavenworth, two nuclear explosions brought the war to a close.

I'm reminded now of remarks made by Paul Tibbets a few years after the war when he was asked about the significance of the 509th Composite Group: the group of B-29 bombers which he commanded. Paul never used many words when a few would do. Here is what he said:

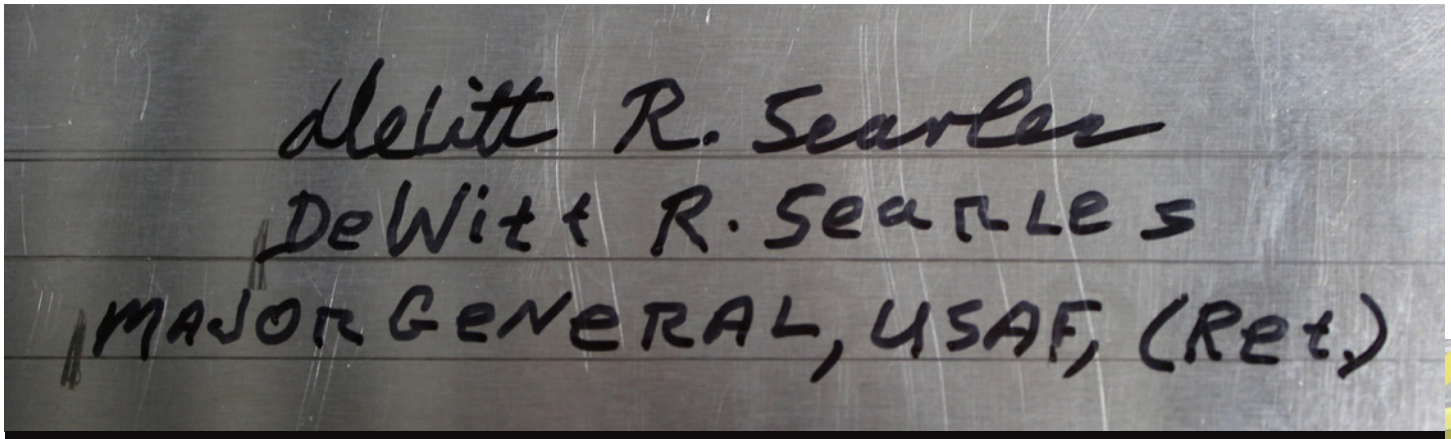
'On August 6th we dropped our first atomic bomb. Three days later we dropped our second.' Two days later Japan asked for peace, and three days later she got it. 'That was the significance of the 509th Composite Group.' "[2]

[2] Dewitt Searles, *"A BRIEF SUMMARY OF THE WORLD WAR II EXPERIENCES OF DEWITT R. SEARLES, A FIGHTER PILOT, IN THE UNITED STATES ARMY AIR CORPS DURING THE 1943-45 TIME PERIOD*, via personal correspondence

Major General Searles had a long and illustrious Air Force career after World War II, some highlights are listed below:

- Commissioned Second Lieutenant, United States Army Air Force, 1942
- Fighter pilot and squadron commander, New Guinea and the Philippines, 1943-1945
- Wing commander, 81st Tactical Fighter Wing, England, 1965-1967
- Inspector general, Tactical Air Command, Langley Air Force Base, Virginia, 1967-1969
- Commander, advanced through grades to major general, United States Air Force, 1971: 327th Air Division, Taiwan, Republic of China, 1969-1971
- Deputy commander, 7/13 Air Force, Udorn Air Force Base, Thailand, 1971-1972
- Deputy inspector general, Headquarters United States Air Force, Washington, 1972-1974, retired
- Assistant vice president, Merrill Lynch, Pierce, Fenner & Smith, Washington, 1974-1987
- Retired, Merrill Lynch, Pierce, Fenner & Smith, Washington, 1987

This month, we sent the main access door of the P-47 to Major General Searles for his signature.



WWII Southwest Pacific P-47 pilot, Major General Searles' signature on the main access door of P-47 42-27609. Dakota Territory Air Museum and AirCorps Aviation are very thankful to Major General Searles for his generous cooperation in signing the access door.

Restoration manager Ryan Underwood holds the main access door of the P-47 before we shipped it to Major General Searles.