Top: A close up of the navigators flight instruments in *Enola Gay*. The dials are (from left to right) the computer for the Air Position Indicator, Airspeed indicator, Altimeter and Fluxgate compass. (***Scott Willey***)

The Air Position Indicator took heading information from the flux gate and used pitot information to give a "digital" readout of latitude and longitude. It was a very advanced instrument for its day and was used in later aircraft into the 60's. The operator set the latitude and longitude at a known location and input magnetic variation. The instrument would then give a continuous read out of the plane's latitude and longitude.

Bottom: The APN-9 LORAN receiver (mounted on the bulkhead wall behind the navigator) and the Navigator's hand set (black box on fuselage centre right) in *Enola Gay*. (***Mike Hanz***)

LORAN (Long Range Navigation) was an American modification of the British Gee system that was first put into operation during 1943. It proved to be very successful and allowed relatively accurate navigation to ranges of about 1,400 miles from the transmitting stations. The first LORAN chains were built to cover the North Atlantic during 1943 and 1944 to assist the vital convoys transporting men and material to Britain for the European war. However, once the island hopping campaign started in the Pacific, the immense distances of featureless ocean that needed to be crossed made LORAN even more vital . The LORAN transmitters were built and operated by the US Coast Guard and it was often the case that US Coast Guard engineers were some of the first people ashore on newly invaded islands should these have been designated as suitable LORAN transmitting locations. Construction would generally be started before the island had been fully secured.

LORAN continued in use long after WWII (indeed the low frequency variant known as LORAN C is still in use today) and *It's Hawg Wild* has an identical LORAN set to *Enola Gay*.

The LORAN receiver shared the antenna with the liaison set, the received signal being split by a signal splitter located on the shelf at the radio operator's station.

The Navigator's hand set was a part of the CFC gunnery system. To calculate the ballistic correction the computer needed various inputs. Many of these were derived from the sights but two, True Airspeed and Density Altitude were calculated using inputs made by the navigator at this panel. The navigator entered barometric pressure (left dial), indicated airspeed (middle dial) and outside air temperature (right dial). These were used to compute true airspeed from the indicated airspeed while density altitude was computed from the barometric pressure and temperature. In standard B-29s the data entered here was used by all five computers although in Silverplate planes only the tail turret computer remained. The Navigator's hand set is missing from *It's Hawg Wild*.

Above: The signal splitter on the shelf above the Radio Operator's station in *Enola Gay* (***Mike Hanz***)

Despite LORAN's dominance in the Pacific, Gee remained more common in Britain and Europe and the RAF's Washingtons had their LORAN receivers replaced by Gee receivers – these being located in their place.

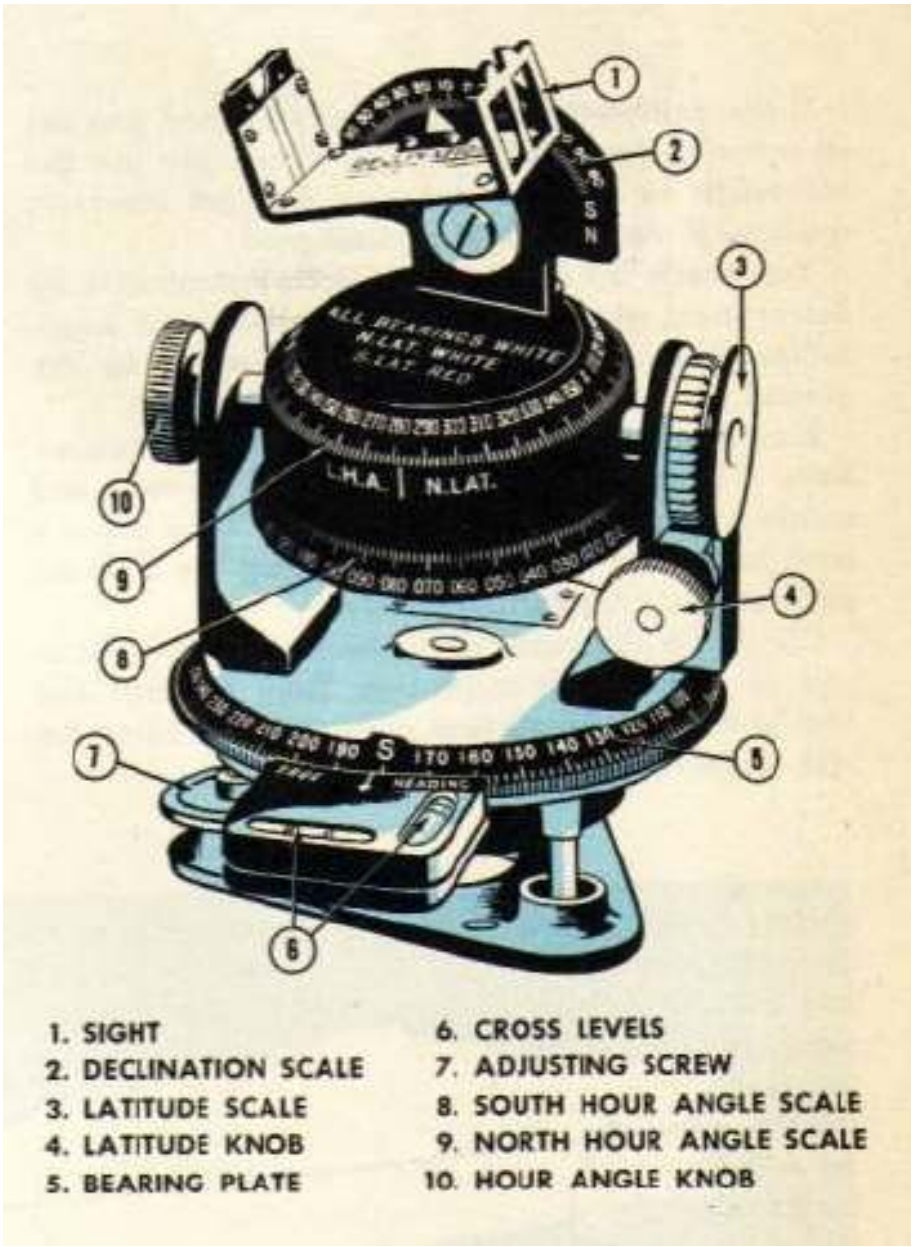
Below: A Gee receiver (left) and indicator (right) displayed at the IWM Duxford. (***Chris Howlett***)

Top: The astrodome in *Enola Gay* (***Taigh Ramey***)

The navigator used the astrodome to take celestial observations (sun or stars) with either his octant or the astro-compass (the device mounted on the ring in the astrodome). To take the readings the navigator would sit in the mouth of the tunnel with his back supported by the back strap.

Bottom: An annotated diagram of the astro-compass from the Bombardier's Information File (***Mike Voisin***)

The astro-compass was used to determine the true heading of the plane although it could also be used to determine true bearing and compass deviation

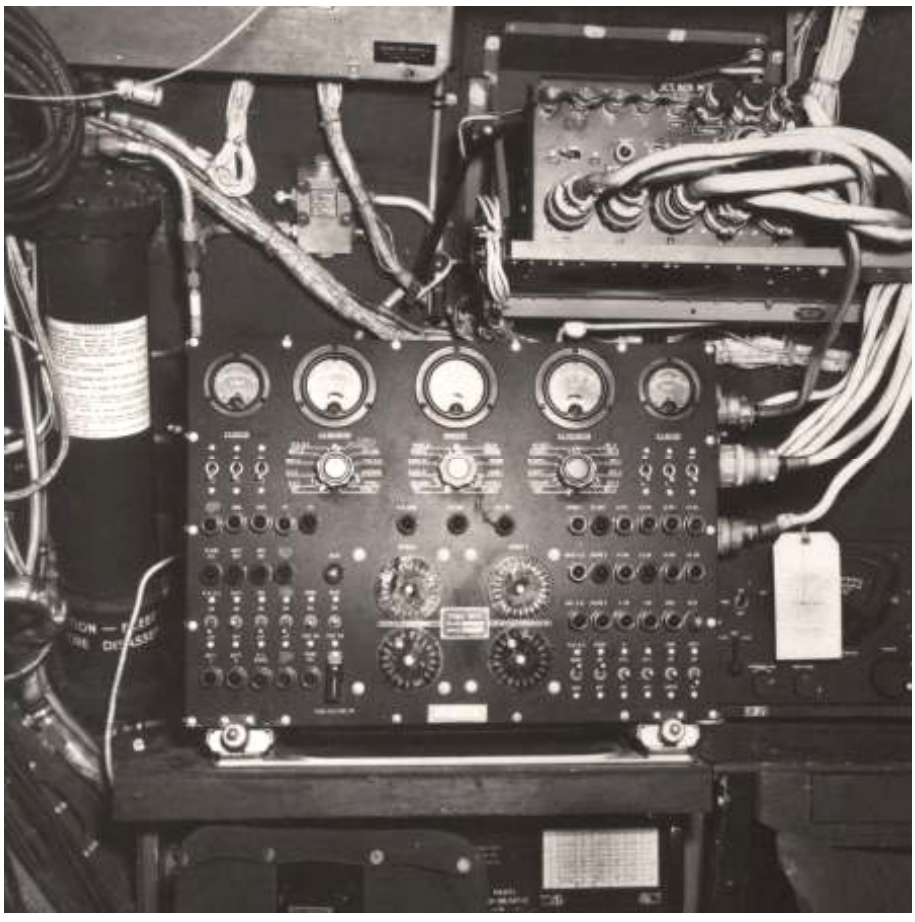


Weaponeer's Station

Above: Definitely a Silverplate only device. The Weaponeer's Flight Test Box (FTB) as fitted to *Enola Gay*. (***Scott Willey***)

The FTB for the atomic bomb was installed on what had been the forward end of the radio operator's table in standard B-29s. Cables from this box ran through the pressure bulkhead and connected to the top of the nuclear weapon. The weaponeer, a Silverplate only crewmember, could monitor the condition of the batteries and the various circuits in the bomb.

The box above is not the box that was in *Enola Gay* on 6 August 1945 but an updated one installed for the Crossroad atomic tests at Bikini Atoll in 1946. The original (pictured right – ***Mike Hanz***) has disappeared, probably when the Crossroad's box was installed.

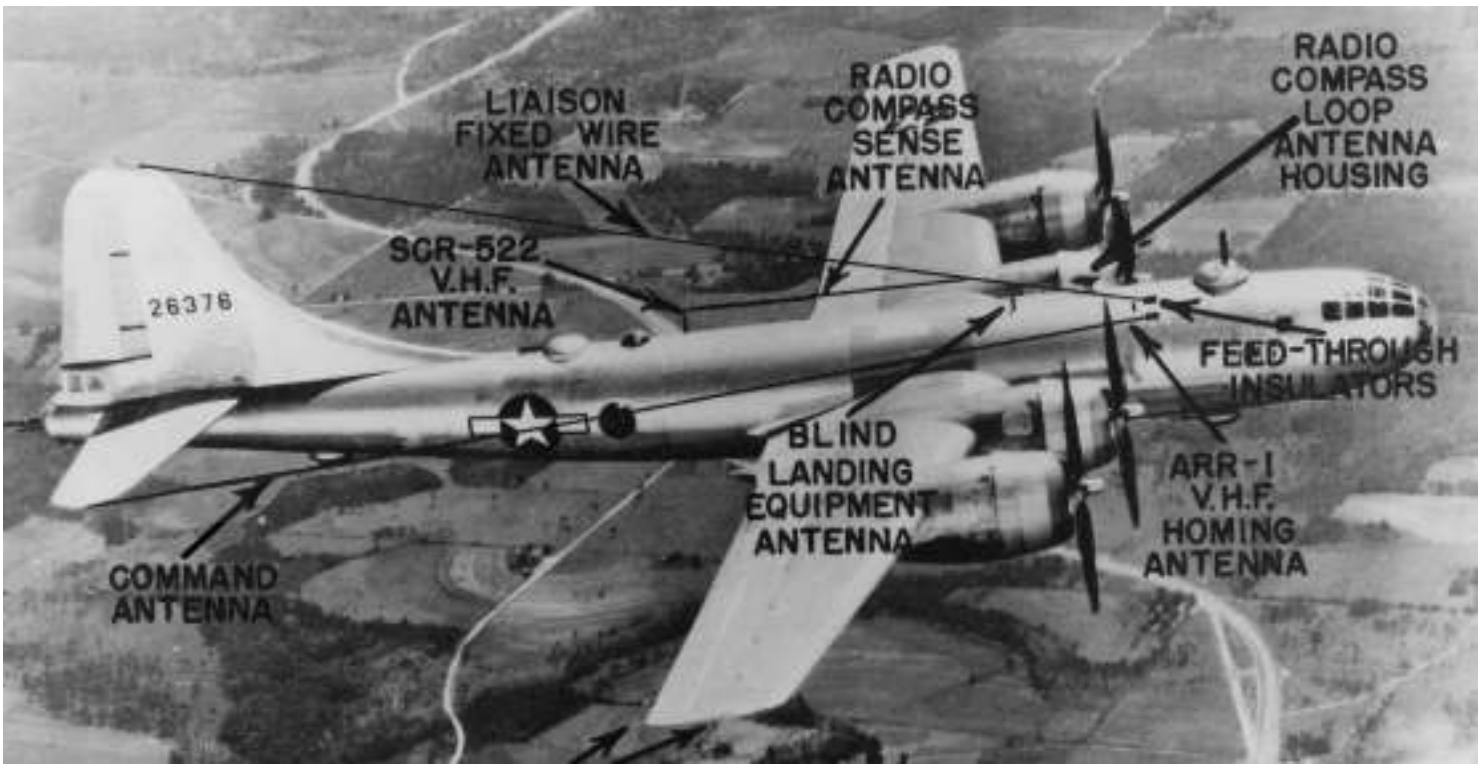


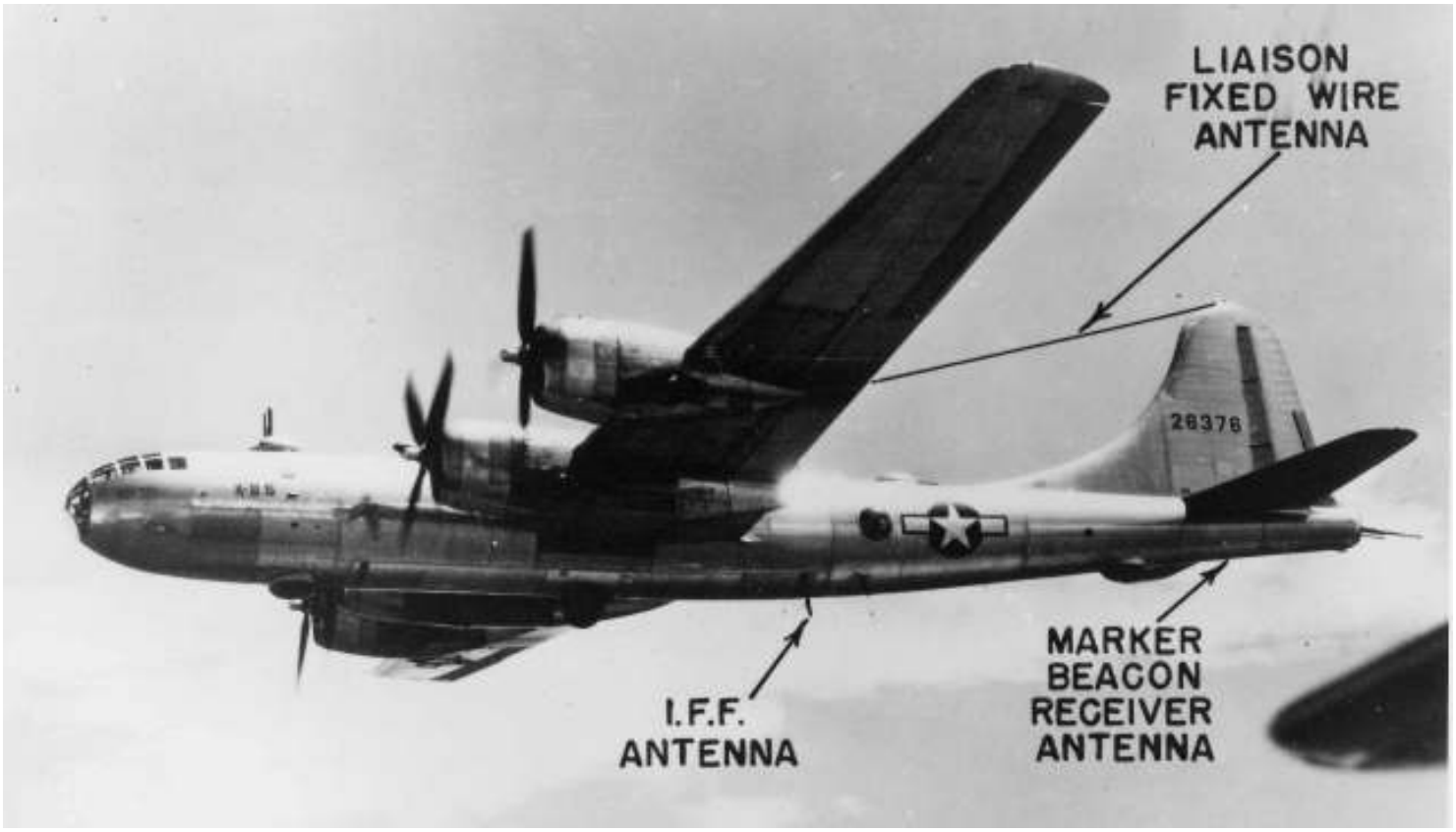
Radio Operator's Station

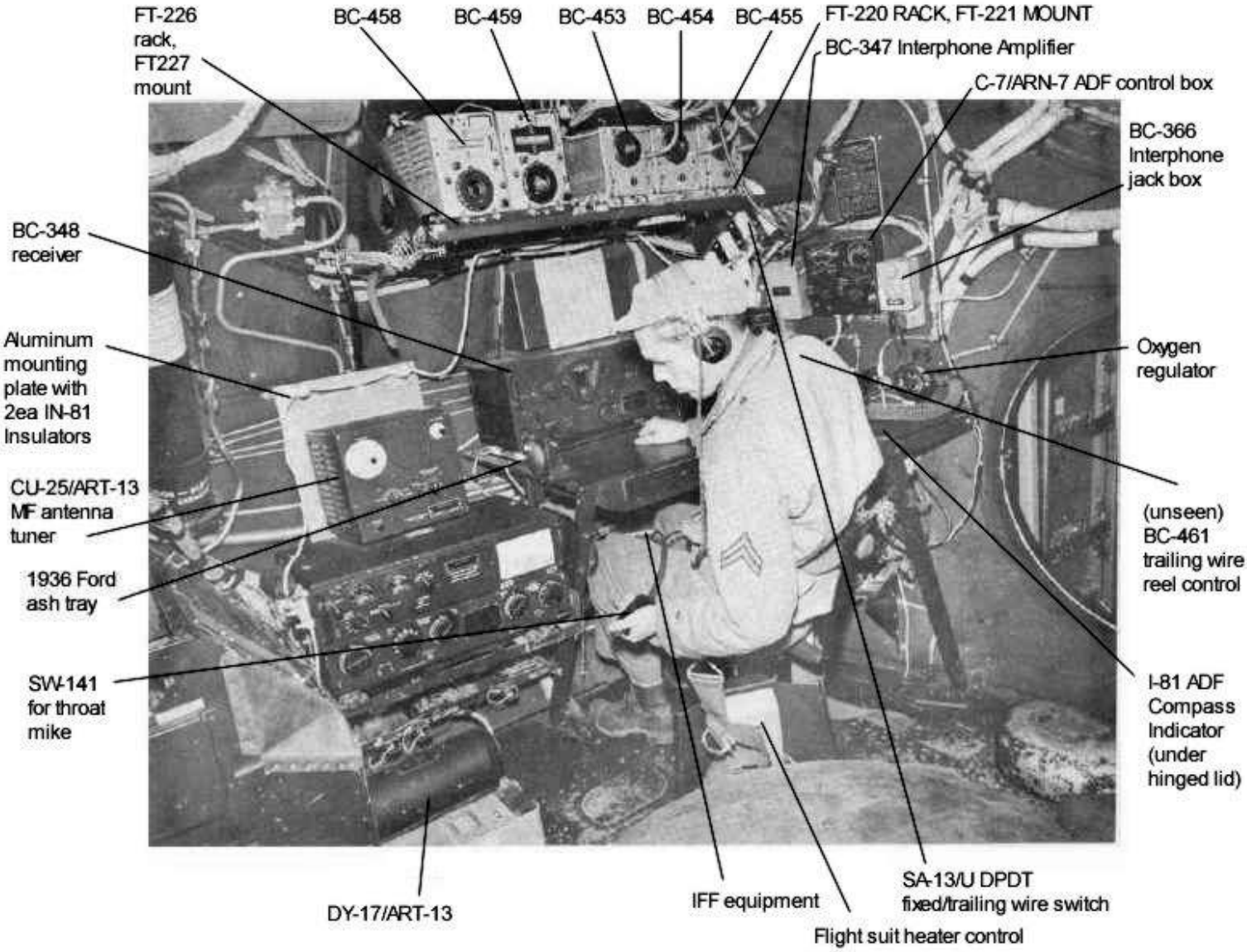
Top and **Middle**: The Radio Operator's station from *It's Hawg Wild*. (***Martin Claydon***).

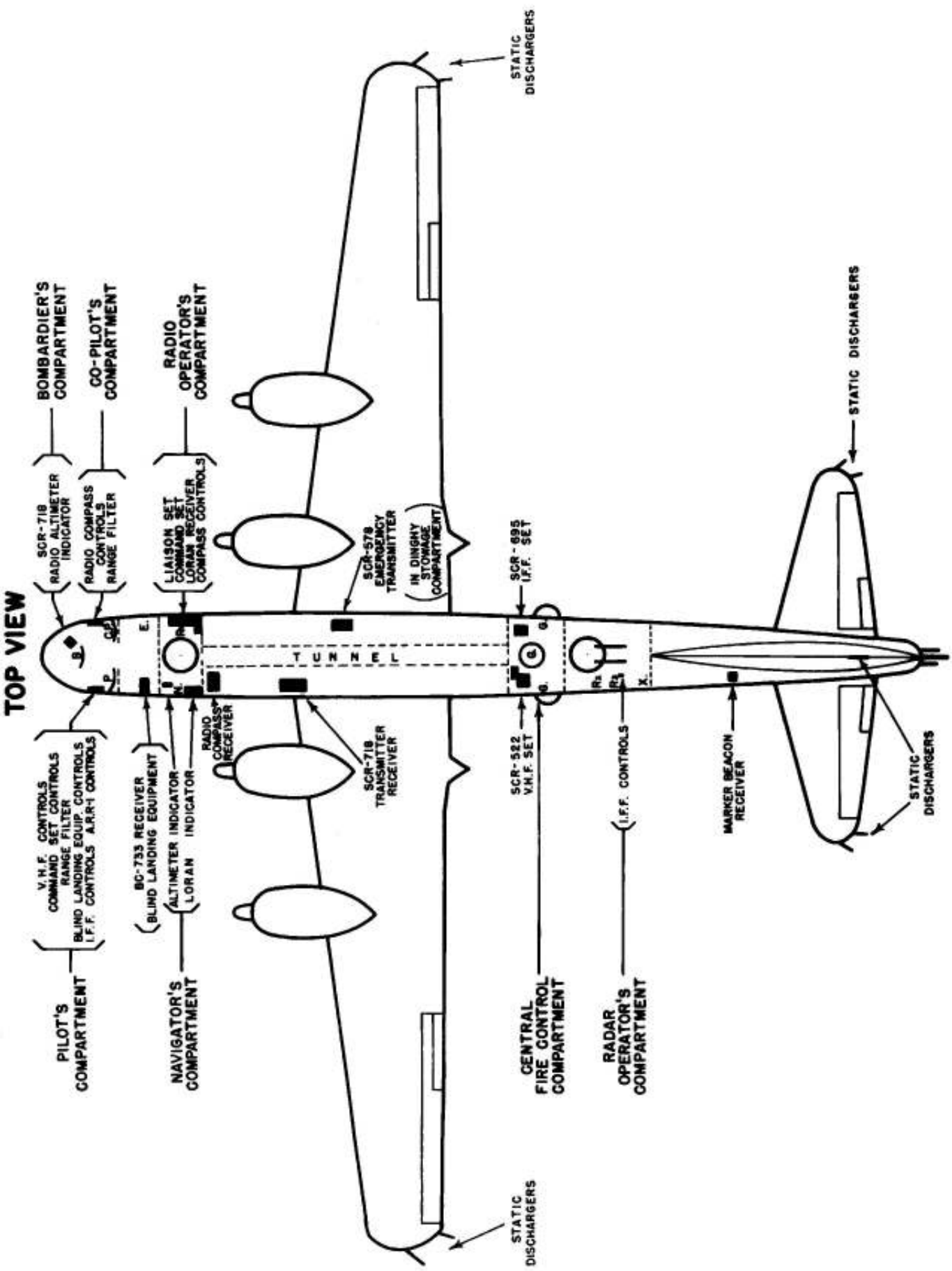
Present is a complete liaison set consisting of: an AN/ART-13 'Collins' HF transmitter (between end of desk and turret in upper photo), a BC-348 HF receiver (on desk in upper photo), a CU25/ART-13 antenna tuner covering the 200kHz – 600kHz range (at left end of shelf in lower photo) and a DY-17 dynamotor (black tubular device on floor between turret tub and the 'Collins' in upper photo). *It's Hawg Wild* probably also carries an AN/ARC-3 VHF command radio set, the controls for which should be in the radio operator's station. The set itself would be located in the gunner's compartment, under the floor just forward of the right scanner.

Bottom and **next two pages** are some period photos and diagram from a report commissioned by the USAAF in 1945 into the 'Operational Suitability of the Radio Equipment in the B-29 Airplanes' showing the locations and use of the various antennae, the full and very comprehensive radio fit of an early standard B-29 and the locations of the radio equipment in a late build B-29. (***Mike Hanz***)




LIAISON
FIXED WIRE
ANTENNA
26376
I.F.F.
ANTENNA
MARKER
BEACON
RECEIVER
ANTENNA


FT-226 rack, FT227 mount
BC-458
BC-459
BC-453
BC-454
BC-455
FT-220 RACK, FT-221 MOUNT
BC-347 Interphone Amplifier
C-7/ARN-7 ADF control box
BC-366 Interphone jack box
BC-348 receiver
Aluminum mounting plate with 2ea IN-81 Insulators
Oxygen regulator
CU-25/ART-13 MF antenna tuner
(unseen) BC-461 trailing wire reel control
1936 Ford ash tray
SW-141 for throat mike
I-81 ADF Compass Indicator (under hinged lid)
DY-17/ART-13
IFF equipment
SA-13/U DPDT fixed/trailing wire switch
Flight suit heater control



RADIO LOCATIONS ON PLANES TESTED

INCLOSURE III

FIGURE I

Radio Antennae Connectors

Above: The forward starboard side of *It's Hawg Wild* showing the connections for the liaison (upper) and command (lower) antennae to the fuselage. ***(Chris Howlett)***. Note also the Flight Engineer's window/escape hatch and the outside air temperature probe behind it.

Middle: Feed through insulators on *Enola Gay* (***Mike Hanz***). The two oval black ports (one just visible at top by navigator's astrodome) present on *Enola Gay* are "feed through insulators" an early means of allowing the antennae to penetrate the fuselage but by mid-1945 were no longer used. Their use made antenna repairs more time consuming and the need to solder the wire coming through each of them to a taut antenna wire actually weakened the antenna, so a design change was made to use the short insulated connectors as shown. The small wire hole in the black oval insulators was simply filled with a sealer, rather than replacing them completely with aluminium patches although they had vanished in post war B-29s such as *It's Hawg Wild* and the RAF Washingtons. The other ends of the HF antennae were fastened to spring-loaded tension units. The one on the horizontal stabilizer is shown to the right (***Mike Hanz***). These tension units allowed the antenna wires to adjust to temperatures from -60 to +140 Fahrenheit (-51 to +60 degrees C) without breaking.

Top, Middle and Bottom: The Radio Operator's station in *Enola Gay*. (***Mike Hanz***)

In the Silverplate planes the radio operator's equipment was significantly changed to make room for the Weaponeer's panel that was located on the forward end of the radio operator's table and also to introduce a few extra items related to the special mission.

The **top photo** shows the high frequency BC-348 liaison receiver with associated Morse key to its right. This and its associated AN/ART-13 liaison transmitter (**middle photo**) are about the only items of radio equipment that remained in their original position. The AN/ART-13 transmitter, made by Collins was generally referred to as the 'Collins' rather than as the AN/ART-13.

To the right of the **top photo**, the open cover should give access to repeater dial for the radio compass but, when the photo was taken, a suitable unit was still being sought – one has since been found and fitted by Mike Hanz. The black panel to the far right (on the bulkhead between the radio compass cover and the liaison set) was unique to Silverplate B-29s. It controlled the audio for a second 'Collins' transmitter that was located under the table by the radio operator's feet (**bottom photo**) as well as the SCR-522 VHF command set that was located in the 'gunner's' compartment. As has already been mentioned, the SCR-522 in *Enola Gay* was replaced during a stop over on the flight to Tinian with the more capable AN/ARC-3 but no one changed the script on the panel!

Standard B-29s had a small radio set comprised of three receivers and two transmitters mounted on the shelf above the liaison set. This was the SCR-274N command set and is shown in the photo on page 41 with its components named (BC-458 etc). To free up space for the Weaponeer's station these were deleted on Silverplate planes, the command function being taken over by the SCR-522 or AN/ARC-3. In the empty lower forward turret there is a set of mounts for a second AN/ARC-3. The set is currently missing but it is thought that the Silverplate planes carried a spare VHF set to give redundancy although it may have been added post war. Research is continuing!

The Communication Tunnel

Top: The un-restored tunnel in *It's Hawg Wild*. (***Ivor Warne)***

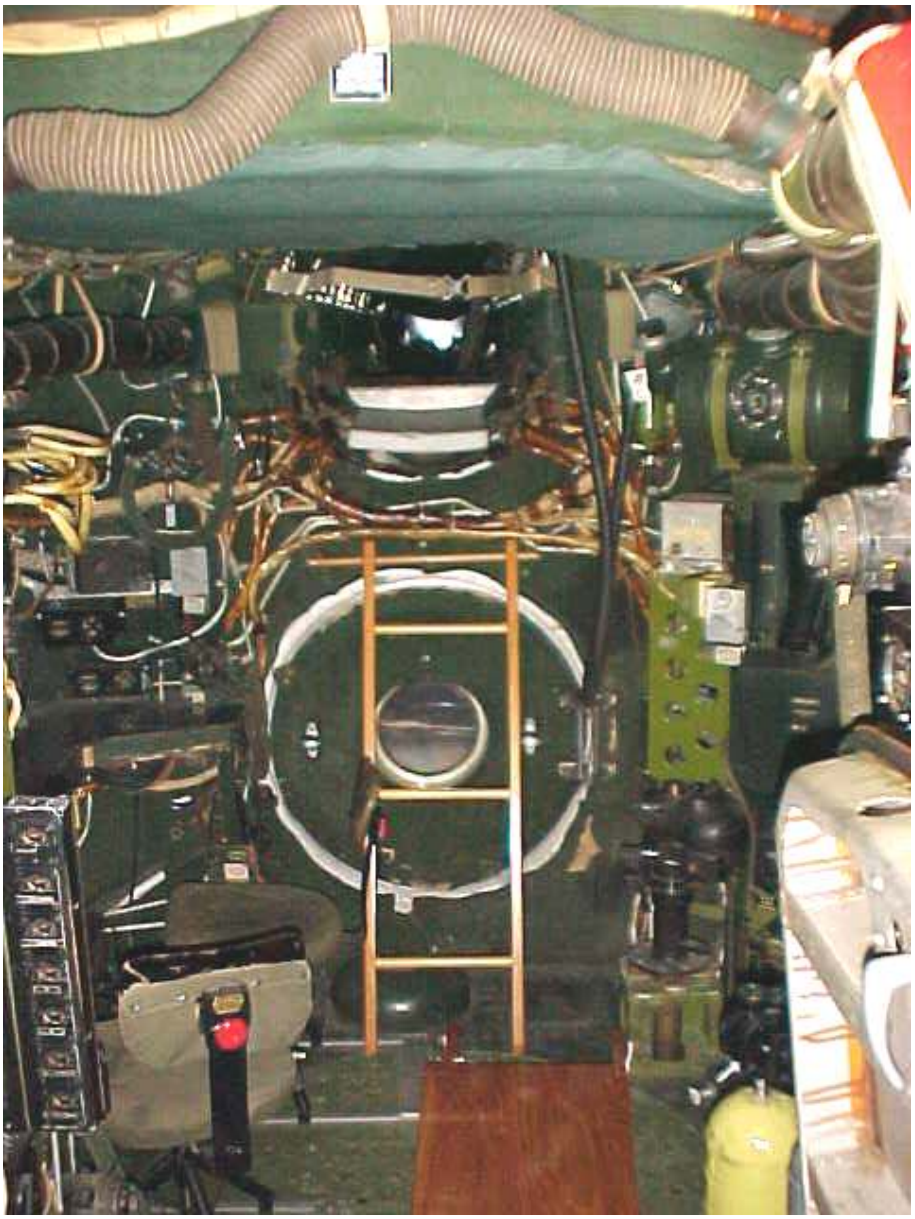
Bottom*:* The tunnel and rear of the forward pressurised area in *Enola Gay* (***Bernie Poppert***)

Perhaps strangely, such a utilitarian item as the tunnel did have a Silverplate modification. The silver insert in the bottom of the tunnel (bottom photo) is the Silverplate addition. It is the front of the modified tunnel area above where the bomb release mechanism mounted. In order to fit a *Fat Man* type bomb into the bomb bay and still close the doors, the bomb had to be mounted high. To allow for this the tunnel had a few feet raised a few inches in order to get the bomb release shackle to a suitable height.

The raised section also incorporated a viewing window so that the shackle could be inspected. With the Fat Man type bomb completely filling the bomb bay there was no other way to ensure that the bomb was correctly latched.

The lower photo shows a view that would not be possible in a standard B-29. Taken from a position adjacent to the Flight Engineer's station the nose entry hatch is open with the hatch visible to the right, the edge of the flight engineer's panel is to the left. The paler green panel in the roof is the padding where the upper forward turret tub would be – the item that would make this view impossible in a standard B-29. Note also the ladder leading to the tunnel entrance. This was stowable but the one shown is not one of *Enola Gay*'s originals. It was built in the Smithsonian's Garber shop from original Boeing drawings by Bernie Poppert (Deputy Chief of Restoration at NASM's Garber Facility).

The drift meter is shown just to the right of the bulkhead hatch leading to the forward bomb bay. Located above it is the AM-26/AIC-2 amplifier for the intercom system while above this is the hydraulic supply tank. This held 3 US gallons (2.5 Imp) of hydraulic fluid. The hydraulic system had one exclusive function; it transmitted force to actuate the brake mechanism. The system was divided into two; one for normal use and one for emergency use.



Above: Looking up into the forward bomb bay (***Mike Hanz***). Note the communication tunnel running along the top of the bomb bay. The raised section of the communication tunnel with its viewing window can be seen above the bomb suspension (extreme top of photo). Either side of the window are two additional ports that allowed limited access to the shackle should this be required. The yellow/green box is the wing centre section. Immediately behind this, above the catwalks in the rear bomb bay are the gear boxes that allowed the main landing gears to be raised or lowered in an emergency. The gear box on the right hand side operated the let hand gear. The gear was moved via a hand crank and required some 774 turns to raise (about 30 minutes of effort) or 387 turns to lower (about 12 minutes of effort).

Forward Bomb Bay

Top: The forward bomb bay in *Enola Gay*. (***Mike Hanz***)

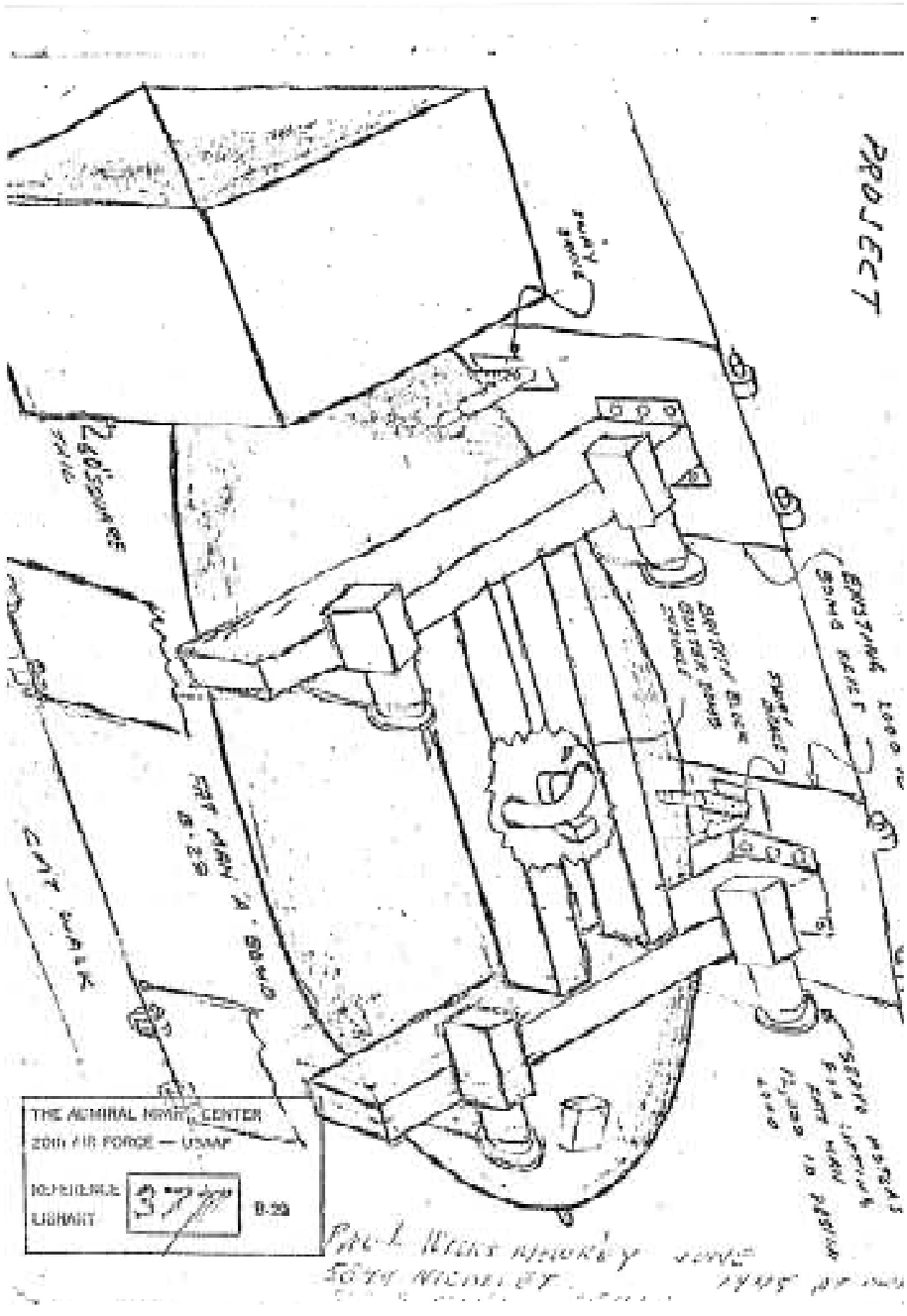
The photo is looking up into the top of the front of the forward bomb bay. Note the H frame, connected to both sets of standard bomb racks, used to hold the single release mechanism adopted for the atomic bombs and to spread the stress of supporting the weapon across more of the airframe. Silverplate aircraft were fitted with braces for both the *Little Boy* and *Fat Man* bombs to keep the single-suspension-point bomb from moving around in the bomb bay (not a good thing with a 5-ton nuclear weapon). The outer braces near the wall are for the *Fat Man* weapon while the yellow X shaped braces were for *Little Boy*. Another, less obvious, Silverplate modification was the extension of the Interphone system into the bomb bays to allow the Weaponeer to talk with other crewmen while he was arming the weapon.

Missing are four sets of hoist motors that were part of the system. They mounted on top of the two large cross beams. NASM is currently trying to find some of these rare items to complete this part of the airplane.

The raised section of the communication tunnel with its viewing port and maintenance holes is clearly visible above the bomb suspension point.

Bottom: A drawing of the bomb mount, sway braces and bomb hoists. (***Jeff Brown***)

The drawing was created by Paul Mowrey, an engineer at Martin's modification center, Omaha, Nebraska and one of those responsible for designing the bomb loading and release mechanism in the Silverplate aircraft. Paul's drawing, not done until 1995 so it may contain errors, shows the four hoist motors currently missing from *Enola Gay* and the British 'block buster' single bomb attachment.



Top: Looking aft in the forward bomb bay in *Enola Gay*. (***Mike Hanz***)

Given the potential danger to North Field, Tinian should an atomic bomber crash on take off it was decided to only arm the weapon once the plane was safely away from the base. The wooden structure running across the bomb bay just in front of the wing spar is the work platform built for Silverplate planes to allow the bombardier and Weaponeer to arm the bomb in flight. It is not the actual platform as this has been lost. It is also only representative since restorer Bernie Poppert had no drawings to go by, and there are no descriptive sources that give a clue as to actual size and shape.

Bottom: A view into the restored forward bomb bay of *It's Hawg Wild*. (***Martin Claydon***)

Note the deflectors on the rear edges of the bomb bay doors (both *Enola Gay* and *It's Hawg Wild*). These were present on both the forward and rear sets of doors and helped the doors open quickly once the airflow caught them. This was of particular use when the emergency door release was activated as this would simply unlatch the doors and thus the deflectors helped them open and then kept them in the open position.

Rear Bomb Bay

Top, Middle and Bottom: Three views of the rear bomb bay in *Enola Gay*. (top ***Mike Hanz***, middle and bottom ***Scott Willey***)

The rear bomb bay was essentially unmodified in the Silverplate B-29s so again is representative of standard B-29s.

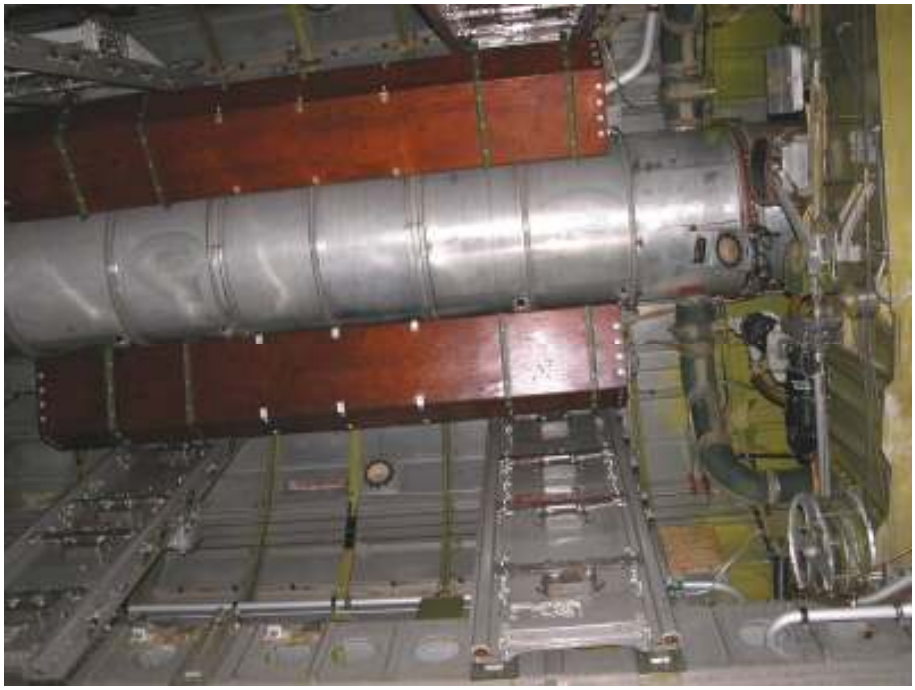
The top photo is looking forward and shows two of the 18 type C-1 low-pressure (400 - 425psi), shatterproof oxygen cylinders used by the oxygen system. When fully charged these provided about 10 hours of oxygen for an 11 man crew at 15,000 ft altitude.

Note the actuating rods for the bomb bay doors. These were fitted to the forward end of both the forward and rear bomb bay doors. The phase three Silverplate B-29s were fitted with pneumatic actuators for their bomb bay doors. These allowed the doors to open or close in less than a second and could be linked to the bomb release mechanism so they opened automatically when the bombs were to be released. This development was not a Silverplate only addition as pneumatic bomb bay doors were introduced into B-29As fairly early and all standard B-29s had them fitted in the factory by early 1945.

One non standard item is the wooden boxes mounted either side of the tunnel (middle photo). These were cargo rack assemblies used for transporting as yet undetermined material.

The bottom photo is looking rearward and if this were a standard B-29 the Central Fire Controller's swivel chair would be visible through the opening. However, as this is a Silverplate B-29 the chair is missing as is the CFC's sighting blister – the blanking plate covering the blister's opening can be seen.

Also missing from the photo are two 640 US Gallon (533 imperial Gallon) auxiliary bomb bay tanks that were carried on the August 6 mission primarily to counter the weight of the bomb and so better balance the plane. The NASM is looking for two such tanks to fit to *Enola Gay* as currently preserved.



Bomb Hoist, Bomb Release Mechanisms and Bomb Shackles

Left: A compilation of diagrams from the Bombardier's Information File (***Mike Voisin***)

The C-3A bomb hoist assembly (**left top**) consisted of two separate hoists which operated together. It hoisted the bomb into position and rolled it slightly to assist the attachment of the shackle to the bomb rack.

The hoist could be operated either manually or electrically and was able to hoist bombs weighing up to 2,000lb. Two C-3A hoists working together were needed to lift bombs of 4,000lb. It was part of the standard bombing equipment of the B-29.

The bomb release mechanism was an electrically operated mechanical device designed to cause the bomb shackle to release and arm the bomb. The B-29 was fitted with the A-4 bomb release (**left centre**). If needed, the A-4 release could be operated manually by turning the trip screw (marked TRIP) on the front of the A-4 in the direction indicated. This affected the rotary solenoid like an electrical impulse tripping both the release and arming levers.

The bomb shackle (**left bottom**) carried, armed and released the bomb. They attached to the shackle suspension hooks on the bomb rack so that the arming lever and release lever were positioned in the bomb release mechanism.

The type of shackle varied depending upon the weight of bomb to be carried: the B-7 carried bombs from 100lb to 1,100lb; the B-10 could carry bombs up to 1,600lb while the D-6 carried 2,000lb or 4,000lb bombs.

Note that, like the release mechanism, the shackle had to be positioned the right way round. In the B-29 the bomb racks were symmetrical and special care was needed to avoid fitting them backwards.

The bomb arming controls provided selective arming of the bombs. They were attached to the edges of the bomb racks where they were operated by an arming switch at the bombardier's station and allowed bombs to be salvoed either armed or safe.

Two arming wires were used, one for the nose fuse and one for the tail fuse. The nose fuse arming wire loop was placed in a catch on the arming control. The tail fuse arming wire loop was inserted in the bomb shackle. The tail fuse was always armed by the bomb shackle for selective and train releases and made safe for salvo release.

When the arming switch was set to SAFE and the bombs salvoed the nose fuse arming wire was allowed to pull free from the arming control and the bomb would drop safe. If the arming switch was set to ARMED the wire would be held and arm the bomb as it dropped. In both cases, when salvoing bombs, the tail fuse remained safe.

A-2 BOMB ARMING CONTROL

Above: The A-2 Bomb Arming Control.. Diagram from the Bombardier's Information File (***Mike Voisin***)

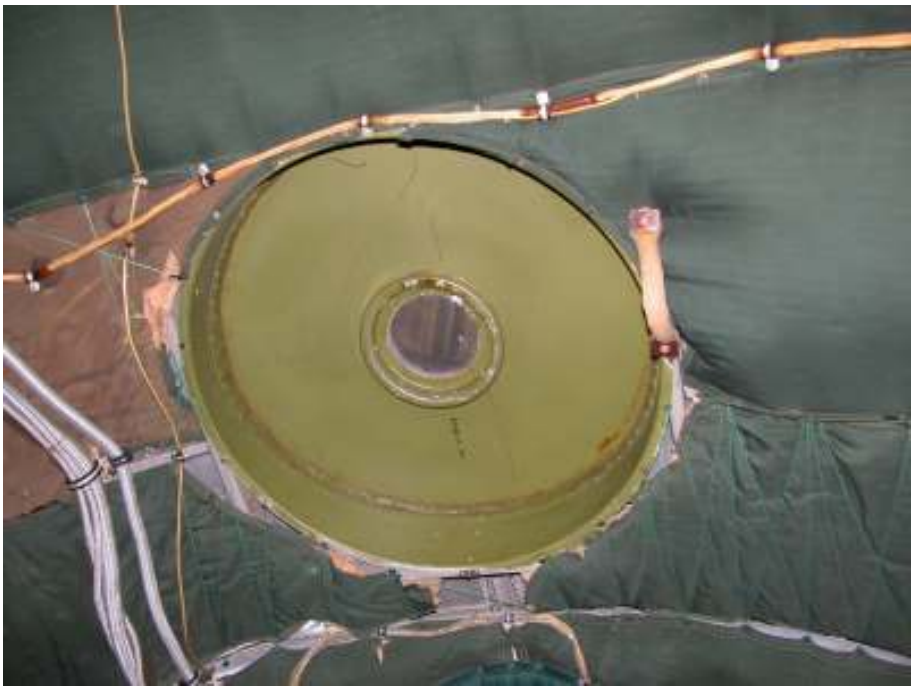
Below: A page from the Bombardier's Information File showing the various types of standard bombs carried by US B-29s. (***Mike Voisin***)

Left: Bomb Arming Controls fitted to the forward edge of a bomb rack in the rear bomb bay of *Enola Gay*. Each bomb rack had a similar arrangement. (***Scott Willey***)

AERIAL BOMBS

CLASSIFICATION	WEIGHT	NOMENCLATURE	COLOR MARKINGS BODY	COLOR MARKINGS BANDS	HE WEIGHT	FUZES NOSE	FUZES TAIL	SHACKLES	MINIMUM SAFE BA	TARGETS AND REMARKS
GENERAL PURPOSE	100	AN-M30	LUSTERLESS OLIVE DRAB	(1") YELLOW BAND AROUND NOSE AND TAIL	54	AN-M103 or M118 or M119	AN-M100A2 or M112A1	B-7 or B-10	1500	Railroad equipment, trackage, small buildings, ammunition dumps, planes on ground, hangars
	250	AN-M57			123				2000	Railroad equipment, trackage, RR terminals, ammunition dumps, destroyers, subs, transports
	500	AN-M64			262		AN-M101A2 or M113A1		2500	Steel railroad bridges, subways, concrete docks, light cruisers
	1000	AN-M65			530		AN-M102A2 or M114A1		3000	Reinforced concrete bridges, steel RR bridges, piers, approach spans, medium cruisers
	2000	AN-M66			1061			D-6	3000	Massive reinforced concrete and suspension bridges, heavy cruisers, battleships, dams
LIGHT CASE	4000	AN-M56			3245	AN-M103	AN-M102A2		3000	Raze areas equal to a city block or more
SEMI-ARMOR-PIERCING	500	AN-M58A1			145	STEEL PLUG	AN-M101A2	B-7 or B-10		Armor plate, lightly armored vessels, reinforced concrete
	1000	AN-M59			303		AN-M102A2			
ARMOR-PIERCING	1000	AN-Mk33			144	NONE	AN-Mk228			Heavily armored naval vessels
	1600	AN-Mk1			215			B-10		
DEPTH	350	AN-Mk47			252	AN-Mk219 or AN-M103	AN-Mk224 AN-Mk234 (LATERAL)	B-7 or B-10		Submarines and surface craft
	650	AN-Mk29			464					
FRAG. PARACHUTE	23	AN-M40			2.7	AN-M120A1	NONE	N-3	80	Personnel—If detonated at proper angle, almost 100% casualties over 120 ft. radius Tanks—Running gear, 60-90 ft.; light tank, direct hit Planes—Motor, 60 ft.; wings and tanks perforated, 200 ft.; structural damage, 3-4 ft. Telephone wires—100 ft., some cut by side spray
FIN	20	AN-M41			2.7	AN-M110A1			800	
CLUSTER	500	M26				M111A2				
CHEMICAL MULTI-PURPOSE	100	M47A2	GRAY	*See Below	68	M108	BURSTER M4	B-7 or B-10		Irritating physiological effect on personnel, neutralize areas, contaminate materiel HS produces irritating physiological effect WP produces screening smoke or incendiary effect
	115	M70			64	AN-M110A1	BURSTER M10			
INCENDIARY	4	AN-M50A1		1 PURPLE	1.8	NONE	STRIKER UNIT			Usually in 5 bomb clusters; includes 1 AN-M50XA1 (150 gr. BP burster charge)
PRACTICE	100	M38A2	BLUE		2.6	NONE	M1A1			Training—22 gage, light sheet metal body, filled with about 80 lbs. of dry sand. Actual weight, 98 lbs.
FLARES (PARACHUTE)	44	M24	GRAY	BLUE		NONE	FRICTION IGNITER		2500-3000	Target lighting; dropping rate, 11.6 ft./sec.; burns 3-3.5 min.; yellowish tint, 1,000,000 candle power
	53	AN-M26				M111A2			4000-25,000	Target lighting; dropping rate, 11.6 ft./sec., burns 3-3.5 min.; 800,000 candle power
	16	M8A1				NONE				Emergency landings; can be used for bombing. Burns 3 min.; soft yellow, 400,000 candle power
TORPEDO	2100	Mk13-2			600	EXPLODER MECHANISM	NONE			Effective range, 6000 yds.; speed about 40 mph; has 93-98 hp steam and gas turbine engine

*BANDS: (NOSE, TAIL AND CENTER) 1 GREEN, NON-PERSISTENT; 2 GREEN, PERSISTENT; 1 PURPLE, INCENDIARY; 1 YELLOW, SMOKE; 1 RED, IRRITANT SMOKE (Vomiting Gas)



Gunner's Compartment

Top: The left scanner's position in *Enola Gay* with its blanked off sighting blister. (***Scott Willey***)

In a standard B-29 the grill in the floor (just visible at bottom left corner of photo) was to cool the computers for the CFC system, four of which were located under the floor in this compartment (one each for the top, left, right and tail sighting stations). With the deletion of most of the guns in the Silverplate planes, only the tail gunner's computer remained.

Middle: Tankers anchored off Tinian taken from Enola Gay's left scanner window. (***Kenneth Eidnes***)

The central gunner's compartment in the Silverplate B-29s was effectively gutted as all the guns, turrets and controlling equipment had been removed. The scanners were still necessary to monitor the flaps as they were extended or retracted and the engines but the scanning had to be done through the small windows set into the blanking panels rather than through the large blisters as found on standard B-29s. The small windows were still effective though as is shown by the photo to the left, taken from the left scanner window of *Enola Gay* while flying from Tinian sometime shortly after the Japanese surrender. The vessels anchored are reportedly tankers bringing aviation fuel to the island and the number well illustrates the logistical problems associated with maintaining and operating some 400 B-29s so far from home (the 20th Air Force also had around 400 B-29s on Guam and 200 on Saipan compounding the problem!).

Bottom: The blanked off Central Fire Controller's astrodome in Enola Gay. (***Scott Willey***)

Top: A general view of the gunner's compartment in *FiFi*, the B-29 preserved by the Commemorative Air Force. Although more representative than *Enola Gay's*, the compartment is still missing a lot of the equipment that would have been found in operational B-29s. (***Frank Farrell***)

Note the small black and silver item on the pillar against the bulkhead to the right of the CFC chair. This is one of two cabin pressurization regulators (the other is hidden by the open bulkhead door). The pressurization system started at an altitude of 8,000 ft. From there to 30,000 ft, the system maintained a cabin altitude of 8,000 ft. Above that, a pressure differential of 6.55 psi was maintained so at 33,000 ft it felt like 10,000 ft inside. At 40,000 ft, the cabin was still at a relatively comfortable 12,500 ft. The Flight Engineer controlled the cabin pressurization and monitored it with an internal altimeter. Any excess air provided by the pressurizing superchargers was vented overboard by these regulators.

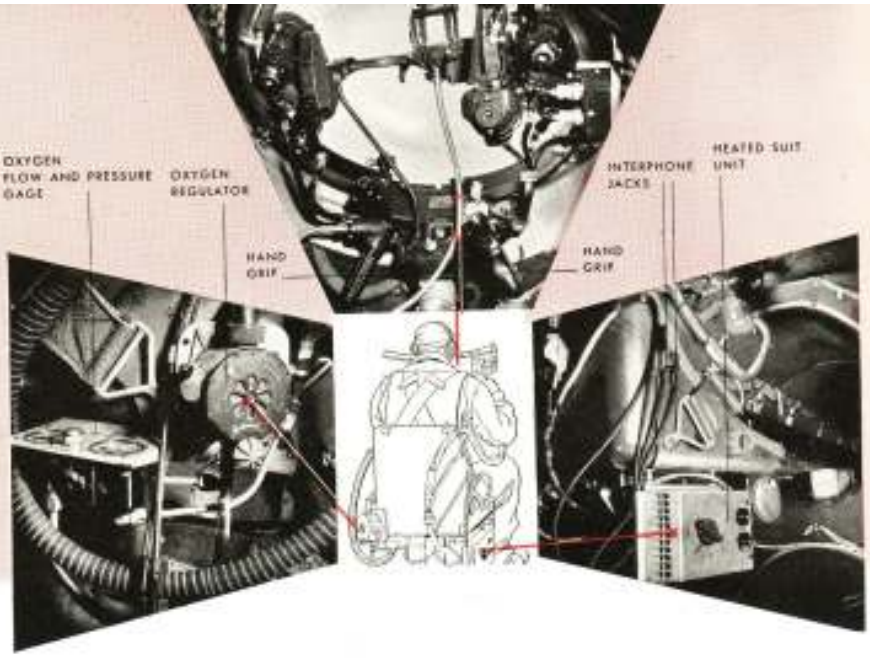
Middle: The right scanner's seat in *Enola Gay*. (***Scott Willey***)

The bright green item behind the seat is a walk around oxygen bottle. The small wooden box behind the seat is a cover allowing access to the AN/ARC-3 command radio while the controls mounted on the right hand end of this box (just behind the oxygen bottle) are for salvoing the bomb load if the bomber was hit and caught fire—it reduced the chances of blowing up immediately!

Bottom: The floor of Enola Gay's gunner compartment. (***Mike Hanz***)

The floor of the compartment was made of ¼ inch varnished plywood panels screwed to aluminium stringers. The panels lifted out to give access to equipment or antennae locations underneath. Illustrated is a hatch (this particular one is actually in the Countermeasure officer's area) giving access to the ARR-5 antenna port. The antenna was so long it had to be deployed after take off and recovered prior to landing (see page 61). The plug shown blanked the port to retain cabin pressurisation should the antenna not be used.

HOW TO TURN ON THE TOP SIGHTING STATION



FACTS AND FIGURES

Movement of the Top Gunner's Sight

The top gunner can swing his sight in a full circle horizontally. In elevation, he can sight from just below horizontal (—5 degrees) to straight up (90 degrees).

Turret He Has First Call On

The top gunner has sole charge—primary control—of the upper aft turret. This turret is always under his control, and he cannot give control to anyone else.

Other Turrets He Can Operate

The upper forward turret comes under his control at all times when the nose gunner is not using it. All switches for turning on this turret are on the top gunner's control box, and he must always help the nose gunner by keeping the switches in proper position.

Field of Fire of His Turrets

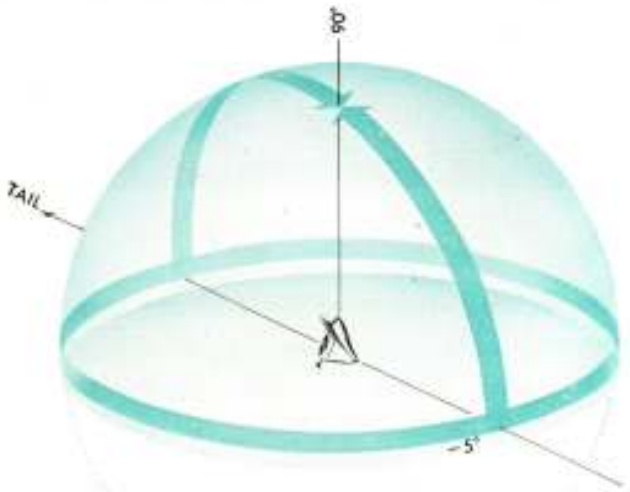
The upper aft turret swings a full circle in azimuth. In elevation, it covers the entire top surface—from horizontal to straight up. The only exception is when the guns are pointed forward; then the contour follower keeps them at least 11 degrees above horizontal.

The upper forward turret swings a full circle in azimuth. In elevation it travels from a little below horizontal (—5 degrees) to straight up.

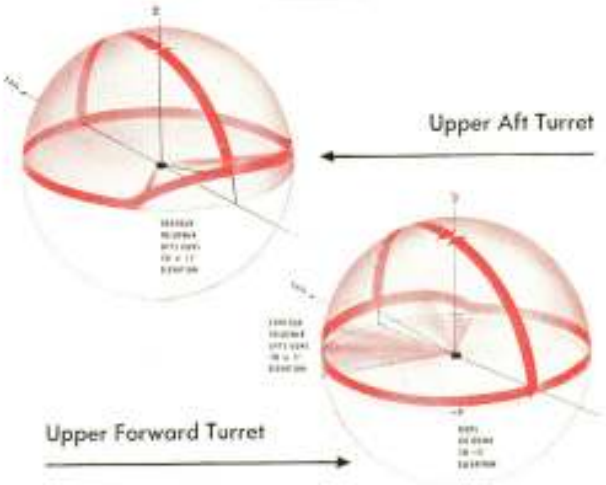
Stowing Duties

The top gunner is responsible for stowing the upper aft turret—with its guns pointed forward and as near horizontal as the contour follower permits.

Since he has all of the switches for the upper forward turret, he is also responsible for stowing this turret—also with the guns pointed forward and horizontal.



Sighting Area



Above and next three pages: Four pages from the USAF publication 'Air Forces Manual No. 27 Gunnery in the B-29' relating to the top and side gunner's switches. (***Taigh Ramey***)

THE TOP GUNNER'S SWITCHES

In the top sighting station you will sit in a swivel chair, in front of the only ring-mounted sight in the B-29. When you take your seat at this station, be careful not to damage the sight mounting—use the support handles, not the mounting, to pull yourself into the seat.

Once you are seated, take these steps in order:

1 Turn on the two switches marked **power fwd. aux.** and **power rear aux.** This will supply current in both upper turrets to warm up the computers, start the air compressors for the gun chargers, and operate the gun circuits.

2 Press all the power breaker buttons at the left end of the control box to make sure the circuits are closed.

3 Turn on the **power A.C.** switch—a main power switch.

4 Turn on the **computer** switch. This will start your computer and the gyroscopes on your sight. Now wait at least 10 seconds to avoid overloading the circuits. Use the 10 seconds to make sure the right is working properly as described on page 5-7-1.

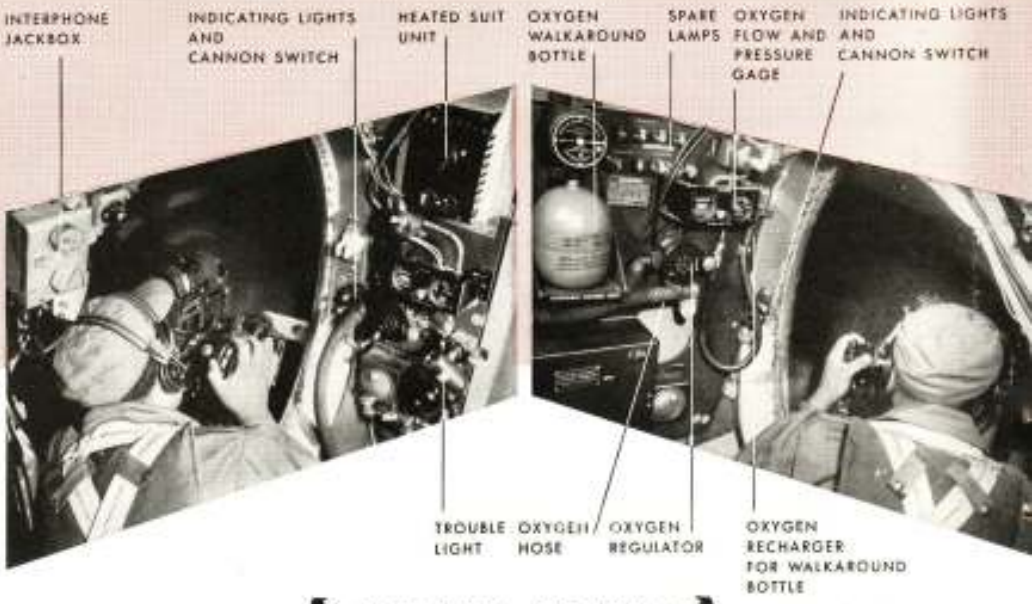
5 Turn on the switch marked **power fwd.** This supplies current for operating the upper forward turret—be sure to notify the nose gunner, who has first call on using this turret, before turning it on.

6 After another 10-second wait, turn on the switch marked **power rear.** This supplies current for operating the upper aft turret.

7 The other switches can now be turned on in any order you find convenient. The **guns** switches are safety switches for the trigger circuits; on the ground they should be turned on just before testing the triggers, and in the air they should be turned on just before firing test rounds and then left on. The **camera** switches supply current to operate the gun cameras.

You are now ready to operate the sight and guns, as described in Section 3. As you move your sight, the guns in the upper aft turret will follow, and your trigger will fire the guns. If the nose gunner is not using the upper forward turret, you will also be aiming and firing the front guns.

HOW TO TURN ON THE RIGHT OR LEFT SIGHTING STATION



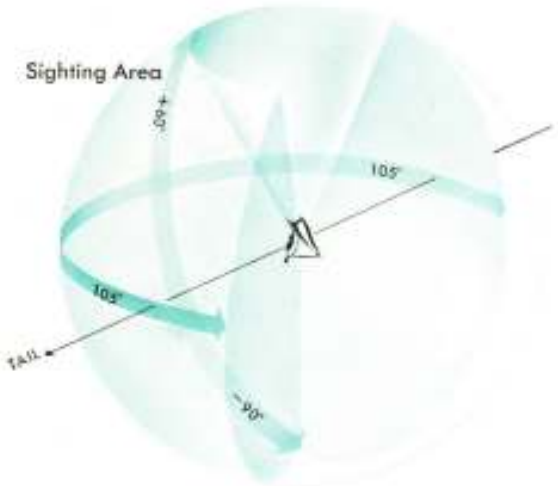
FACTS AND FIGURES

RIGHT GUNNER · LEFT GUNNER

They sit across from one another, facing rear of bomber.

Movement of the Side Gunners' Sights

The left gunner can swing his sight horizontally to cover the entire left side of the plane; the movement covers slightly more than a half circle. In elevation, he can sight from straight down (—90 degrees) to two-thirds of the way up (60 degrees). The right gunner covers the same area on the right side of the plane.



Turret They Have First Call On

The two side gunners share sole control—primary control—of the lower aft turret. They can transfer control of this turret back and forth by turning a switch placed between them. No other gunner can operate this turret.

Other Turrets They Can Operate

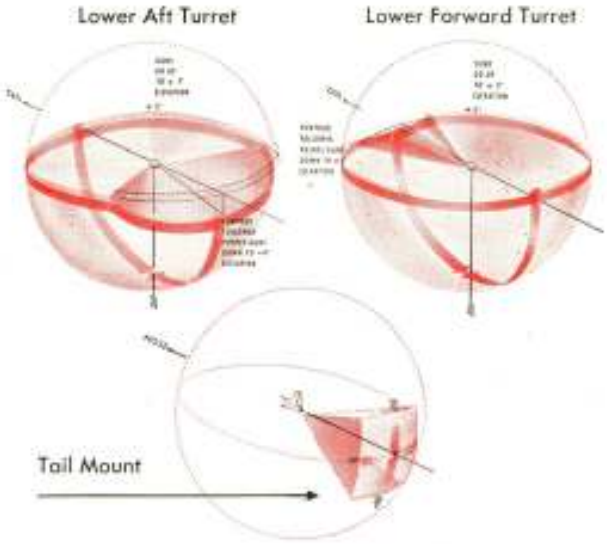
The two side gunners take over control of the lower forward turret when the nose gunner is not using it. They also take over the tail mount when the tail gunner is not using it.

Field of Fire of Their Turrets

The lower aft turret swings a full circle in azimuth. In elevation, the guns move from a little above horizontal (5 degrees) to straight down (—90 degrees). But when the guns are pointed forward, the contour follower keeps them a little below horizontal (—9 degrees).

The lower forward turret swings a full circle in azimuth, and in elevation its guns move from a little above horizontal (5 degrees at most points) to straight down.

The tail mount guns move a third of the way (30 degrees) up, down, and toward either side.

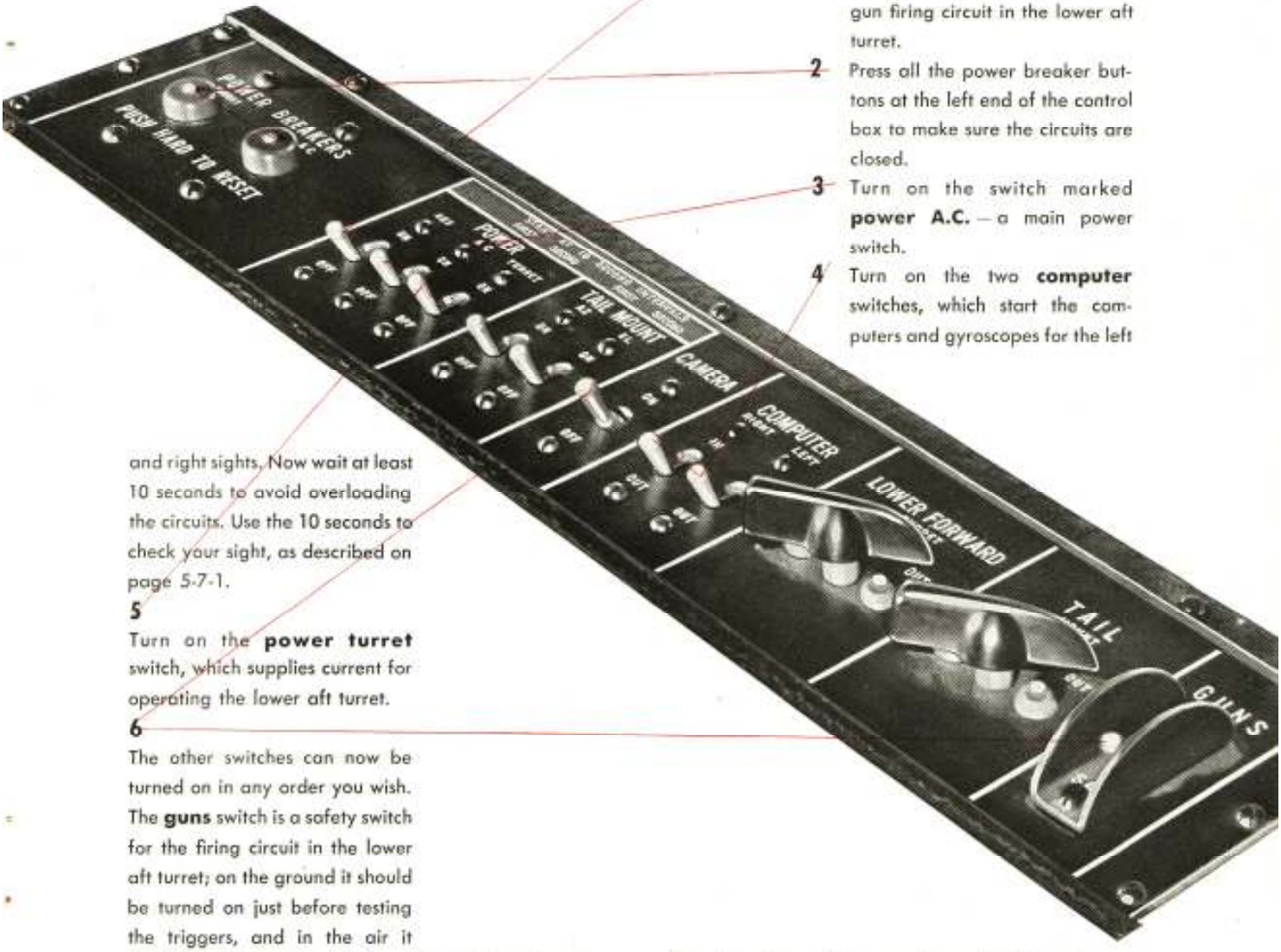


Stowing Duties

The side gunners are responsible for stowing the lower aft turret—pointing aft and at +5 degrees elevation.

THE SIDE GUNNERS' SWITCHES

At the side stations, the two gunners share a single control box. To start operating the station, take the following steps in order:



1 Turn on the switch marked **power aux.** This will supply current to warm up the computers, turn on the air compressor for the gun chargers, and operate the gun firing circuit in the lower aft turret.

2 Press all the power breaker buttons at the left end of the control box to make sure the circuits are closed.

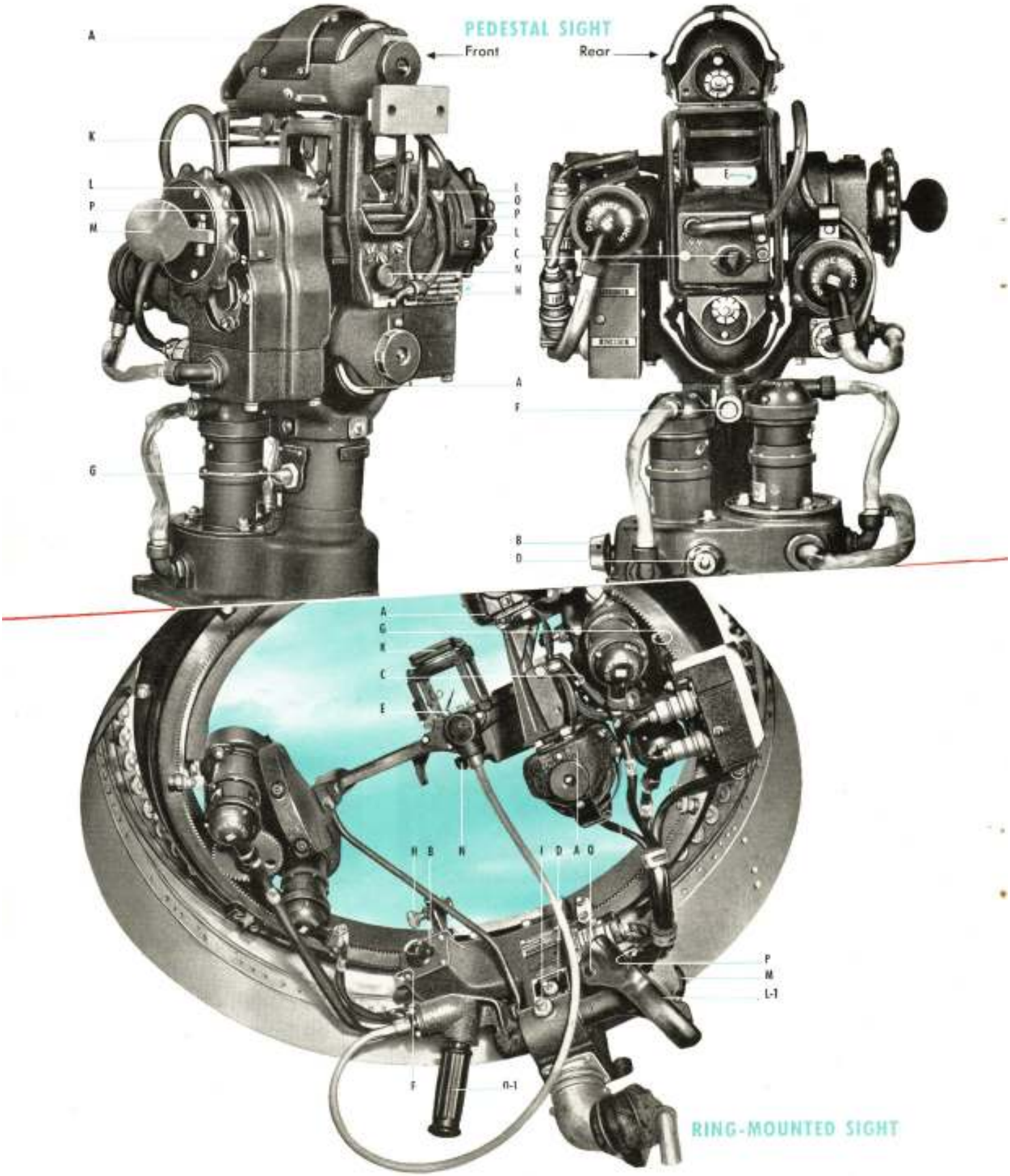
3 Turn on the switch marked **power A.C.** — a main power switch.

4 Turn on the two **computer** switches, which start the computers and gyroscopes for the left and right sights. Now wait at least 10 seconds to avoid overloading the circuits. Use the 10 seconds to check your sight, as described on page 5-7-1.

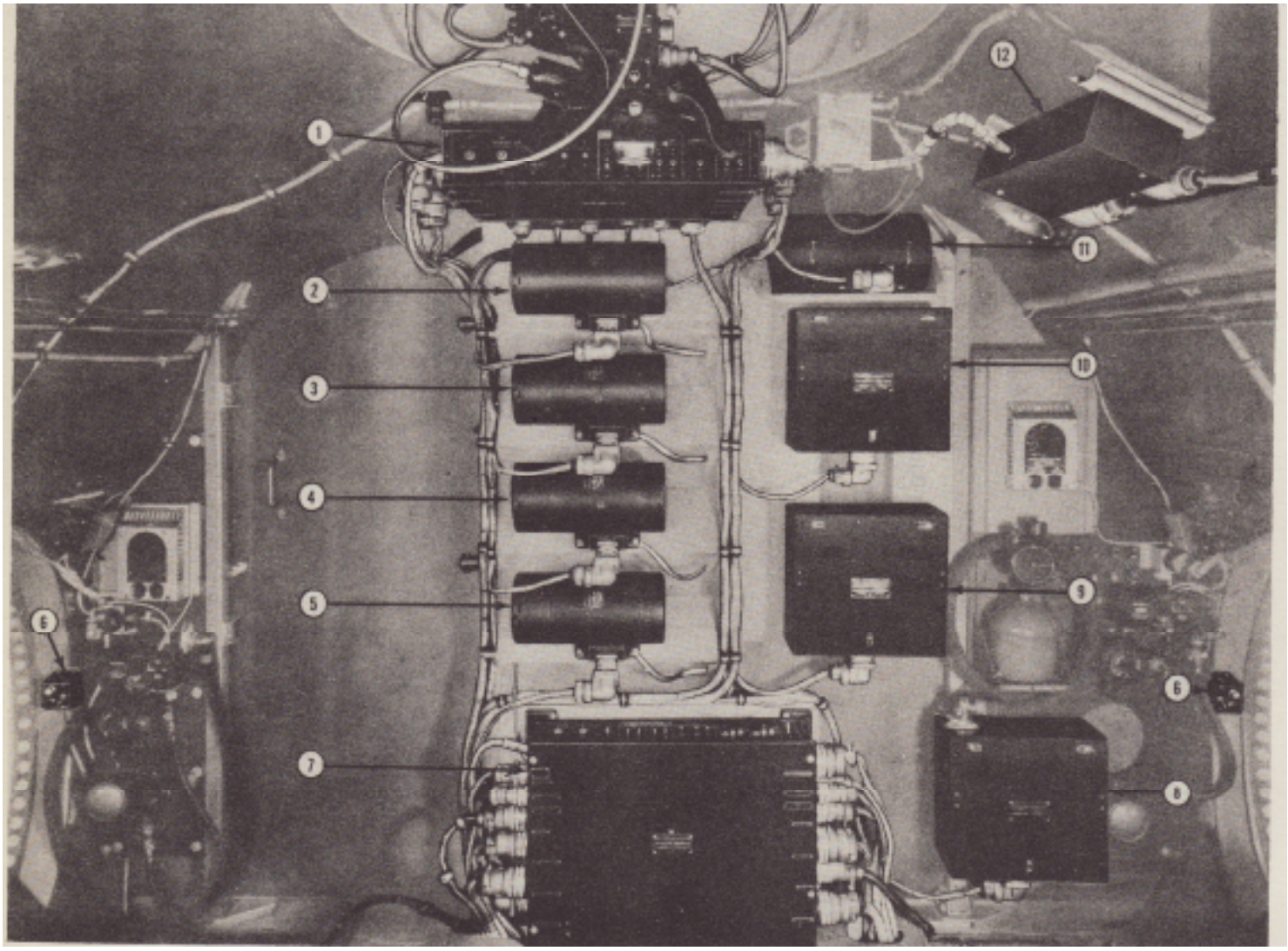
5 Turn on the **power turret** switch, which supplies current for operating the lower aft turret.

6 The other switches can now be turned on in any order you wish. The **guns** switch is a safety switch for the firing circuit in the lower aft turret; on the ground it should be turned on just before testing the triggers, and in the air it should be turned on just before firing test rounds and then left on for the rest of the mission. The **camera** switch supplies power for operating the gun camera. The switches marked **tail mount az.** and **tail mount el.**, for supplying power to run the tail mount in azimuth and elevation, need not be turned on at all except in emergencies—for the tail gunner has the same set of switches and will be using them.

The other two switches on the control box have a special purpose. The one marked **lower forward turret** is used to accept or refuse to operate that turret when the nose gunner is not using it. If the switch is turned to **in,** the side gunners will take over the turret as soon as the nose gunner gives it up. If the switch is **out,** the side gunners have no control over the turret no matter what the nose gunner does.



Above: The B-29 pedestal and ring sights from 'Air Forces Manual No. 27 Gunnery in the B-29'. (***Taigh Rameу***)
A Gyroscope, **B** Rheostat, **C** Filament Switch, **D** Computer Standby Switch, **E** Warning Light, **F** Azimuth Stowing Pin, **G** Azimuth Friction Adjustment, **H** Elevation Stowing Pin, **I** Elevation Friction Adjustment, **K** Sky Filters, **L** Hand Wheel, **L-1** Handle, **M** Action Switch, **N** Target Size Knob, **O** Range Wheel, **O-1** Range Grip, **P** Trigger, **Q** Push-to-Talk Button

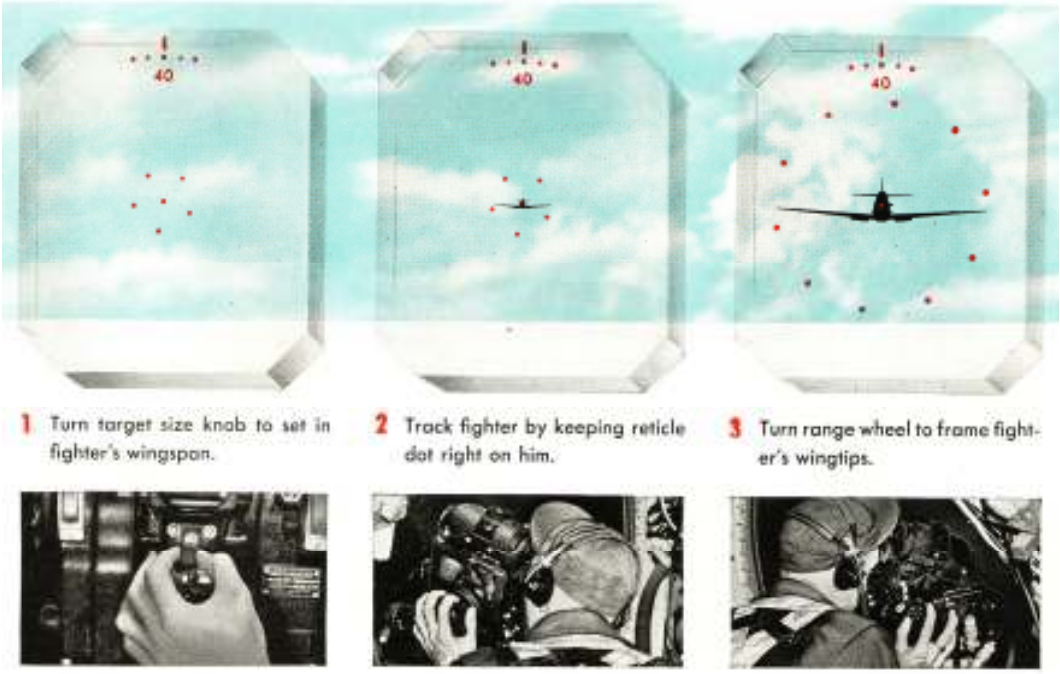


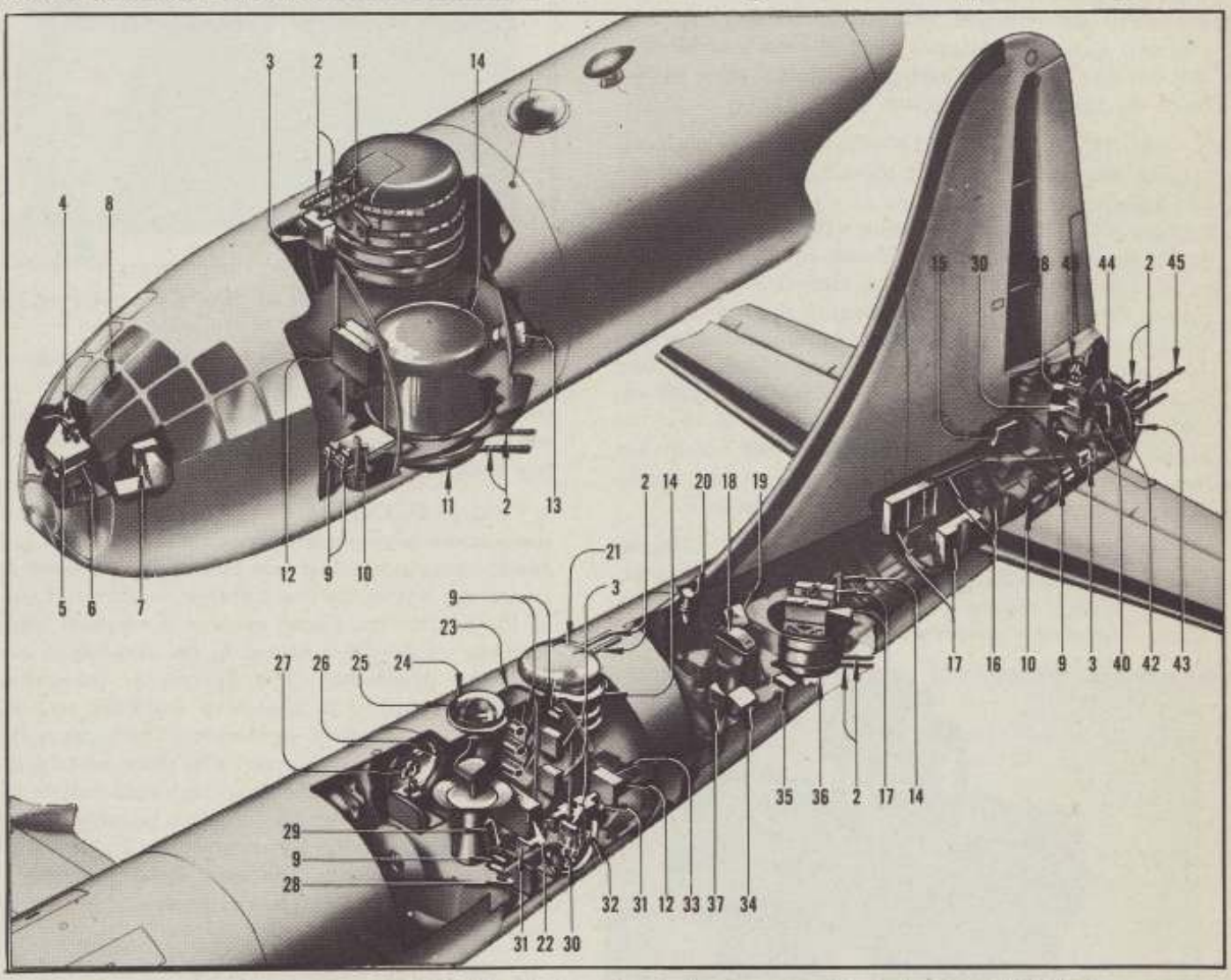
Above: The rear of the gunner's compartment. (***Taigh Ramey***)

1 Top Gunner's Switch box, **2** Upper forward turret azimuth amplidyne, **3** Upper rear turret elevation amplidyne**, 4** Upper rear turret azimuth amplidyne, **5** Lower rear turret azimuth amplidyne, **6** side gunner stations' auxiliary control box, **7** Side Gunner's Switch Box, **8** lower rear turret servo amplifier, **9** upper forward turret servo amplifier, **10** upper rear turret servo amplifier, **11** Upper forward turret elevation amplidyne, **12** upper sighting station auxiliary control box.

Right: An extract from 'Air Forces Manual No. 27 Gunnery in the B-29' showing the operation of the sighting reticule. (***Taigh Ramey***)

The sights have a small glass plate onto which the sight projected a small ring of orange dots with another in the centre. The gunner first entered the target's wingspan via the target size knob. He then tracked the target by keeping the centre dot right on it while rotating the range wheel so as to keep the ring of orange dots framing the targets wingtips which allowed the computer to calculate the range to the target.



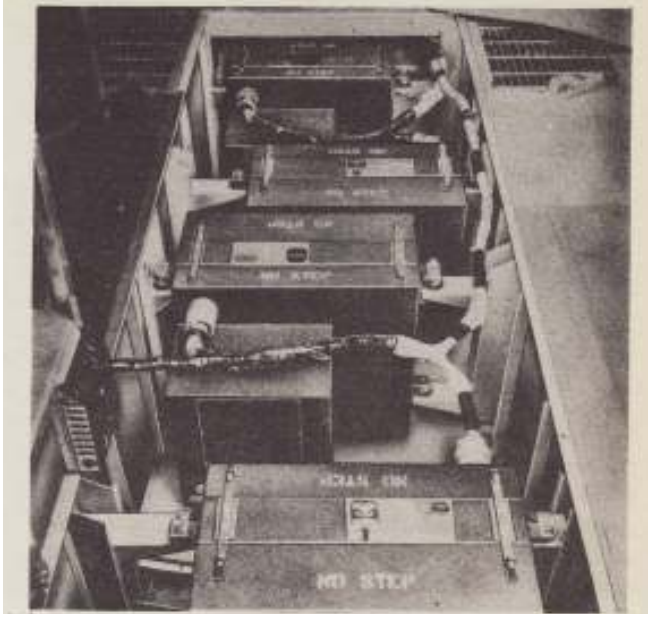


1. Gun Sight Aiming Point Camera.
2. Caliber .50 Machine Gun.
3. Servo Amplifier.
4. Nose Gun Sight.
5. Bombardier's Table.
6. Lower Forward Turret Control Box.
7. Camera Intervalometer.
8. Nose System Switch Box.
9. Amplidynes.
10. Dynamotor.
11. Lower Forward Turret.
12. Single Parallax Computer.
13. Altitude and Airspeed Handset.
14. Turret Safety Switches.
15. Selector Panel.
16. Caliber .50 Ammunition Track.
17. Caliber .50 Ammunition Boxes.
18. Vertical Camera.
19. Right Hand Oblique Camera.
20. Type K-20 Camera.
21. Upper Rear Turret.
22. Blister Station Control Box.
23. Upper Control Box.
24. Upper Sighting Blister.
25. Upper Gunner's Sight.
26. Auxiliary Control Switch Box.
27. Right Blister Gunner's Sight.
28. Computer Voltage Regulator.
29. Switch Box Blister.
30. Left Blister Gunner's Sight.
31. Double Parallax Computer.
32. Auxiliary Control Switch Box.
33. Computer Armor Plate.
34. Left Hand Oblique Camera.
35. Camera Junction Box.
36. Lower Rear Turret.
37. Camera Shut-Off Valve Box.
38. Azimuth Drive Motor.
39. Elevation Drive Motor.
40. 20 mm Feed Chute Assembly.
41. 20 mm Gun Switch.
42. 20 mm Ammunition Box.
43. Tail Turret.
44. Gun Camera.
45. 20 mm Cannon.
46. Tail Gunner's Sight.

Figure 592—Gun and Camera Equipment Location Diagram

Above and right: A diagram and photo from AN 01-20EJ-2 , 'Parts Catalogue for USAF series B-29, KB-29M, KB-29P and WB-29 Aircraft revised 15 November 1951' showing the gun and camera locations (above) and the computers under the floor in the rear pressurised compartment (right) (***Taigh Ramey***)

The photo (right) is looking forward in the radar operator's compartment. The AN/APQ-13 equipment rack (see next page) is just visible at the extreme lower left. From bottom to top (rear to forward) the computers are; tail sighting station (type 2CH1C1 - single parallax computer); left blister sighting station, right blister sighting station, top sighting station (type 2CH1D1 - double parallax computers). In standard B-29s the computers were protected by armour plate (see page 14) but this and all but the tail sighting station computer were deleted in the Silverplate planes. See also page 16.



Radar and Countermeasure Operators' Stations

Top: The rear of the gunner's compartment in *Enola Gay* looking through the 'door' to the Radar and Countermeasure Stations. (***Scott Willey***)

The curtain door and canvas 'walls' to the right are another Silverplate addition since standard B-29s had a wall made of armour plate (see pages 14 and 59). The deletion of this was part of the weight savings of the Silverplate modifications. The canvas 'door' can be closed to keep light out of the compartment while the radar and countermeasures operators were working their scopes. Note the medical kit on the wall in front of the large water flask. The vertical green board next to the medical kit should hold one of the three fire extinguishers carried inside the aircraft. The other two should be mounted adjacent to the Flight Engineer's panel and next to the rear entry hatch.

Bottom: A general view of the Radar and Countermeasure station room. (***Scott Willey***)

The circular hatch at the back gives access to the rear unpressurised section and, ultimately, the tail gunner's compartment.

The Radar operator occupied the seat on the right hand side of the picture (left side of plane) with the radar equipment being mounted on the wall in front of him and in the green rack to the right of the picture. The radar equipment shown here was a standard B-29 fit and is representative of all standard B-29s including the RAF's Washingtons. The countermeasure equipment is located behind the canvas wall and only just visible in the extreme lower right of this photo.

Note the control cables running along the wall to the left (a similar set run along the wall to the right, behind the radar equipment). Also, one of the two air pressurisation ducts going to the tail gunner's compartment can be seen running vertically to the left of the open bulkhead hatch. The other duct is hidden behind the radar equipment.

The prototype and very earliest B-29s (maybe only the YB-29s) had no Radar or countermeasures suite fitted and this compartment contained crew rest bunks. Oddly, many references mention these bunks and imply that they were a standard feature on most, if not all, B-29s. This is not so and bunks played only an infinitesimally small part in the B-29 story.

The Radar, the AN/APQ-13, was a US development of the British H2S and almost all operational B-29s had this fitted as standard although the B-29B was fitted with the more advanced AN/APQ-7 'Eagle' Radar instead. The addition of countermeasure equipment came later. Initially flight crews protested against the carriage of this new fangled technology that did not seem to do anything as it meant they could carry fewer bullets for their guns. However, once it became clear that it was effective (especially against gun laying Radar) attitudes changed and everyone wanted the countermeasures equipment.

Top: Radar Operator's table. (***Scott Willey***)

The black box with the white central section mounted on the wall in the centre of the photo is the Computer Box. This was designed to determine range and altitude accurately for the solution of the bombing problem.

Below the Computer Box are the Radar Operator's instruments, the four dials being (from left to right) airspeed, flux gate compass, altitude and a voltmeter.

Bottom: The AN/APQ-13 electronics rack. (***Scott Willey***)

The top box (only half shown) is the Range Unit that is the heart of the AN/APQ-13. The unit controls the timing of the sweep and the bomb release pulse circuits.

Below this is the Synchroniser Unit. This synchronised the sweep and the received signals which made it possible to determine range and azimuth.

Note the Elsan toilet, colloquially known as the 'Tokyo Bombsight', tucked away behind the electronics rack.

B-29 INSTALLATION OF AN/APQ-13

What's in a name? The AN/APQ-13 was so called because it followed what was known as the Army Navy nomenclature system (AN). For complete pieces of equipment the major title of the equipment came after a slant bar after the letters AN and consisted of three or four letters and a number;
First letter (installation): A – airborne (i.e. fitted in a plane), C – air transportable, U – general utility
Second letter (equipment type): G – Telegraph or teletype (wire), I – interphone and public address, N – sound, P – Radar, R – radio, T – telephone, V – Visual and light, X – facsimile or television
Third letter (purpose): C – communication, receiving and transmitting, D – direction finding, G – gun laying, M – maintenance and test, N – navigation, Q – special, R – receiving, S – search and/or detecting, T – transmitting, W – remote control, X – identification and recognition.
The number was simply a sequential number so the AN/APQ-13 was the 13th airborne radar special named in the system. If the equipment was specifically designated for training a T was added as a fourth letter e.g. AN/APQT-13.
Components used the same three letter descriptors and numbers as complete pieces of equipment but replaced the initial AN with a descriptive code. There are too many to list all here but a few examples are: AM – amplifier, CU – coupling unit (special impedance matching or coupling device), DY – dynamotor unit and PP – power pack (e.g. AM-26/AIC on page 11).

Previous page: A page from the USAAF publication 'Radar Observer's Bombardment Information File' showing the layout of the Radar installation in a B-29. (***Mike Voisin***)

Top: A close up of the Radar Operator's desk. (***Scott Willey***)

The Plan Position Indicator (PPI) with its light shade is the black tube hanging from the roof. A slave display is mounted in the Navigator's station in the forward pressurised area.

The large black panel to the right of the PPI and partly hidden by the angle poise lamp is the Main Control Box for the AN/APQ-13 set. This box contained the switches which governed the operation of the system. The left hand of the two meters indicated the various operating currents and voltages while the right hand meter indicated the elevation tilt of the antenna (ranging from -10 to + 65 degrees).

Below Left: An excerpt from the USAAF publication 'Radar Observer's Bombardment Information File' showing the antenna equipment. (***Mike Voisin***)

The unit was mounted between the two bomb bays with the antenna protruding below the fuselage and protected by a streamlined fairing.

Below: The AN/APQ-13 antenna fairing on *It's Hawg Wild*. (***Chris Howlett***)

Note one of the two single dipole antennae (upper centre) for the SCR-718 (protected by a Perspex cover on the museum plane). The other is under the other wing. These antennae and the APQ-13 fairing on *Enola Gay* are almost identical.

Countermeasure Officer's Station

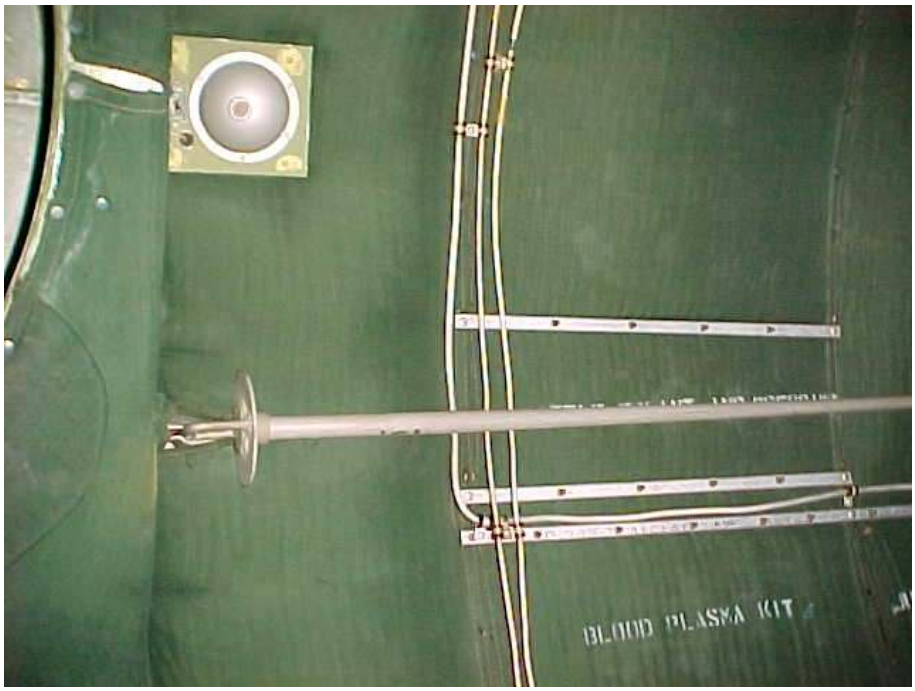
The role of the countermeasure officer (also known as the Raven officer) in a standard B-29 was to identify and counter radars that may be illuminating their plane for gun laying or searchlight direction. To do this, the countermeasure station normally consisted of a single rack of equipment crammed in between the fuselage wall and the tub containing the ammunition for the rear upper turret (upper photo). Shown is an AN/APA-6 pulse analyser (top) with an AN/APR-4 frequency monitor (under). The empty racks below could carry up to two jammers such as the APT-1.

In the Silverplate aircraft, with the deletion of the upper rear turret the extra space allowed more racks to be fitted. These were used to carry additional frequency scanners as well as a number of special monitoring devices. Although all Silverplate planes carried the frequency scanners, only the designated instrumentation plane carried the special monitoring devices leaving *Enola Gay's* racks looking somewhat empty. Also, although not confirmed, it seems that *Enola Gay* carried no jamming equipment on 6 August leaving even more space on the racks! The lower photo shows *Enola Gay's* Raven equipment in arbitrary locations as the actual locations or even fit has not yet been fully established. The equipment has also not been wired up.

The equipment fitted in *Enola Gay* is; an AN/APA-11 pulse analyzer (left on top row) - specialized instrument that permitted detailed characterization of electronic radar signatures, an AN/APA-10 panoramic adapter (middle of top row) - visually displayed a continuous band of frequencies to the left and right of the frequency actually being listened to on any of the three frequency monitors in this bay of equipment, an AN/ARR-7 (right on top row) 0.55 – 42Mc, an AN/ARR-5 (right on middle row) 27.3 – 143Mc, and an AN/APR-4 (bottom row) 40 – 3,400Mc. It is not certain that the ARR-7 was carried on 6 August 1945 and research is continuing. Finally, a PP-32/AR power supply (left on middle row) provided power to both the AN/ARR-5 and the AN/ARR-7.

Top: An early countermeasures fit in a standard B-29. (***Mike Hanz***)

Bottom: The Countermeasure Equipment in *Enola Gay*. (***Scott Willey***)



Top: The AN/ARR-5 special instrumentation antenna deployed through the lower rear fuselage of *Enola Gay* with the blade antenna for the AN/APR-4 to its right. (***Mike Hanz***)

Bottom: The AN/ARR-5 special instrumentation antenna stowed on the roof of the countermeasure compartment. The plate covering the hole left by the deleted upper rear turret is just visible to the upper left. (***Mike Hanz***)

One of the reasons for the additional scanners in the Silverplate aircraft was that, in addition to his normal duties, the Silverplate Raven officer had to carefully monitor the frequencies between 390Mc and 430Mc. This was because the primary fuse in the atomic bomb was a radar altimeter based upon the APS-13 tail warning radar (410 – 420Mc). The fuse system used four such units, known as 'Archies', and the bomb would only detonate when any two of these agreed that they had dropped through the critical altitude. Each 'Archie' was slightly off-tuned from a central frequency but it was still theoretically possible that stray or deliberate radio waves at just the correct frequencies could get two of the Archies to think they had reached the desired altitude and detonate the bomb as soon as it left the bomb bay – which would not have been good! If any potentially dangerous emissions were detected the countermeasure operator would inform the Weaponeer who could alter the frequency of the fuse (there were two choices) or disable them completely and rely on the secondary, barometric, fuse. A third, contact fuse, was always enabled in case all others failed.

The primary instrument for detecting these potentially dangerous emissions was the AN/APR-4. This was normally configured to automatically scan back and forth across a preset range of frequencies which prevented the Raven officer having to constantly kneel on the floor to tend it! The antenna for the AN/APR-4 was a small blade antenna located on the lower right of the rear fuselage (see upper right of top photo).

In addition to the equipment on *Enola Gay* the instrumentation aircraft carried three AN/ARR-5 receivers to monitor the emissions from the three air dropped canisters (dropped by the instrumentation plane at the same time as the bomb) in the vicinity of 50MHz, as well as three AN/ANQ-1 wire recorders to record the overpressure signatures provided by the canister microphones. From this information, approximate yields could be calculated. The somewhat lengthy antenna for the AN/ARR-5 is shown deployed in the top photo and stowed on the roof of the radar/countermeasures compartment for take off/landing below.

The Rear Unpressurised Area

Top: Looking aft from the pressure bulkhead. (***Scott Willey***)

In the foreground to the right of the photo is the Auxiliary Power Unit or 'Putt Putt' as it was universally known.

The raised area is where the lower rear gun turret would have been located. In standard B-29s the ammunition boxes and motor mechanism would have presented an obstacle to movement aft but in the Silverplate B-29s it was covered by a simple cover plate.

Beyond the remnants of the lower rear turret are more oxygen bottles and, in the distance, the rear gunner's compartment.

Note the control cables running along both sides and the green pressurisation ducts leading to the tail gunner's compartment. Also, the green upright metal frames in the extreme foreground (bottom of photo) are the racks for the vertical reconnaissance camera. Cameras were interchangeable and a variety of different cameras could be carried. Records show that Enola Gay carried a K-18 camera on the 6 August mission.

Middle: A close up of the 'Putt Putt'. (***Scott Willey***)

The 'Putt Putt' was a 2 cylinder, 4 stroke, 7 Horse Power engine that drove a 200-amp, 28.5 volt DC generator. The tail gunner had the job of firing this up before engine start. After the engines were running, their six Type R-1 (300 Amp) generators (two on each outboard and one on each inboard engine) supplied the electrical needs of the plane although the 'Putt Putt' was left on until after take off in case an engine failure resulted in a generator failure. After take off the Putt-Putt was shut down and was not used again until the tail gunner started it again before landing.

Bottom: The aircraft battery; Type G-1, 34 ampere hour, 24 volt. (***Scott Willey***)

Note the air pressurisation duct going to the tail gunner's compartment (green tube) behind the battery.

Above The rear entry door of *It's Hawg Wild* from the outside. (***Chris Howlett***)

Left: The rear entry door of *Enola Gay* from the inside (***Scott Willey***)

The rear entry door, located on the right hand side of the rear fuselage was common between the Silverplate and standard B-29s. A fire extinguisher should be fitted to the vertical panel just visible to the extreme right of the photo.

Bottom: The camera bay. (***Scott Willey***)

Located immediately adjacent to the Putt Putt, the racks at the top of the photo either side of the dark green aperture doors held a vertical camera. This was controlled by the panel at the very top of the bombardier's control panel and allowed post strike photos to be taken. On the 6 August mission Enola Gay carried a K-18 camera although several types were available. The K-18 was a low light camera and why this was installed for the mission is unclear. In the event it was not used so its specifications were irrelevant. Note the plywood walk boards that prevented the aircrew (or ground crew) from damaging the thin fuselage skin. Also, the green item at the bottom of the photo is a hatch brace, carried to reinforce the bulkhead hatches in the event of a ditching. Additional braces were carried in the rear pressurised area, strapped to the bulkhead beside the hatch leading to the rear bomb bay.

Top: The blanked off lower rear turret. (***Scott Willey***)

In standard B-29s, the motor mechanism and ammunition tubs that were located here would have presented a significant hindrance to further movement aft.

Middle: Approaching the rear gunner's compartment. (***Scott Willey***)

Once past the remains of the lower rear turret there are no more Silverplate modifications and *Enola Gay* becomes representative of all standard B-29s.

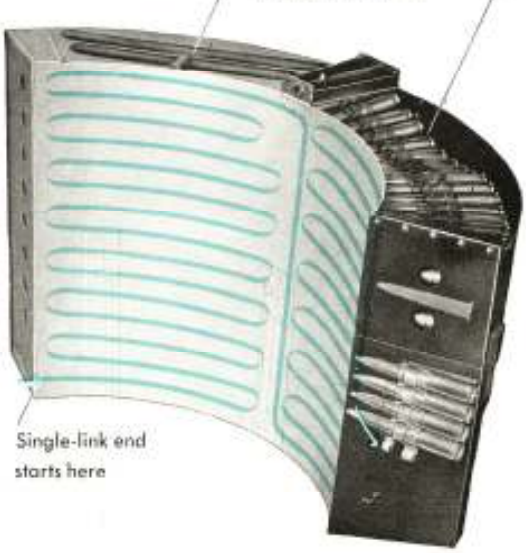
The oxygen bottles seen in the distance in the photo at page 67 above are now in the foreground. Behind these are the rectangular boxes that contain the ammunition for the tail guns while the tail skid mechanism is on the floor between them. In this photo the tail skid is extended, when the plane was in flight it would be retracted and the mechanism would project higher into the space.

Bottom: A photo taken directly under the horizontal stabiliser torque box and between the ammunition boxes for the tail turret. (***Scott Willey***)

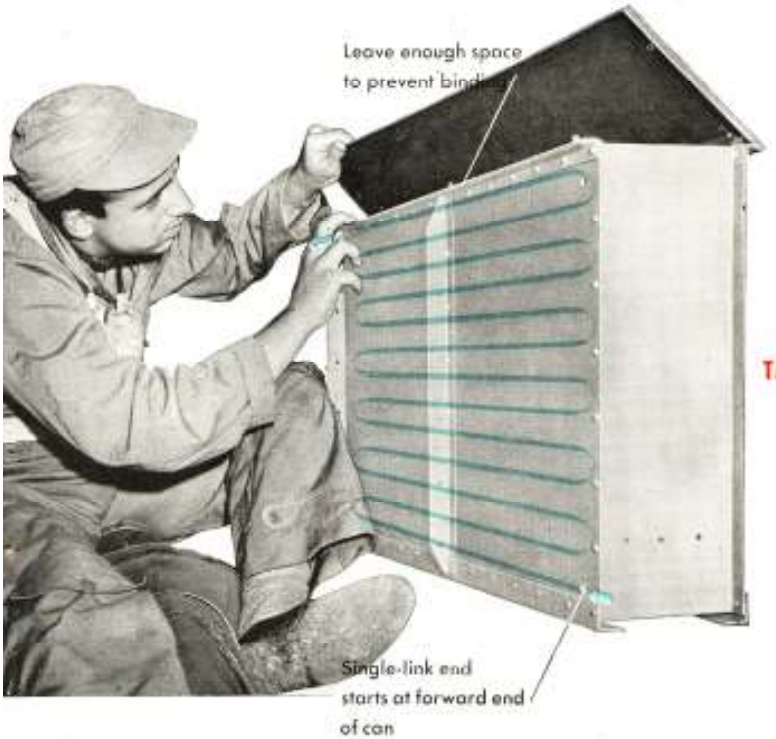
The photo is looking rearward through the open pressure bulkhead door into the tail gunner's compartment. The ladder does not belong here. It is the ladder for the rear entry door and should be secured in brackets against the right hand side of the roof near the Putt Putt. Note the pulleys and control arms for the elevators either side of the bulkhead hatch (close up **below** – ***Scott Willey***). The silver item at the bottom is the ammunition track for the tail turret. A similar track is located on the other side.

LOADING THE CALIBER .50 AMMUNITION

UPPER TURRET



LOWER TURRET



TAIL MOUNT

Ammunition for the caliber .50s is carried in large cans holding about 1,000 rounds for each gun. The cans for the upper turrets, lower turrets, and tail mount vary slightly; the proper method for folding the ammunition belt into each is illustrated in diagrams on this page.

Before loading the cans, make sure the ammunition is in good condition, free from short rounds, and properly belted. Remember that a jam due to bad ammunition is hard to correct after the takeoff.

RESTRICTED

Above: A page from the USAAF publication 'Air Forces Manual No. 27 Gunnery in the B-29' showing how to load the caliber .50 ammunition. Two of the curved ammunition boxes would have held the ammunition for the missing lower rear turret and give an indication of the size of obstruction that this would have presented. (***Taigh Ramey***)

Tail Gunner's Station

Top: The view greeting the tail gunner as he crawled into his compartment. (***Scott Willey***)

The silver tube is one of two that carry the ammunition tracks the ammunition boxes in the rear unpressurised compartment through to the tail guns. A similar tube is located on the opposite side of the compartment.

The cylindrical item above the tube is one of the two Amplidyne motor generators for the tail turret. These took 28 volts DC and turned it into 0 to 60 volts DC power used for the turret drive motors.

Middle: The tail gunner's seat in its stowed position. (***Scott Willey***)

The photo is looking vertically up at the stowed tail gunner's seat from the entry hatch. Once the tail gunner had entered and closed the hatch the seat was lowered down the rails seen in the photo before being used.

Bottom Left: The left hand side of the tail gunner's compartment (right hand side of the plane) (***Scott Willey***).

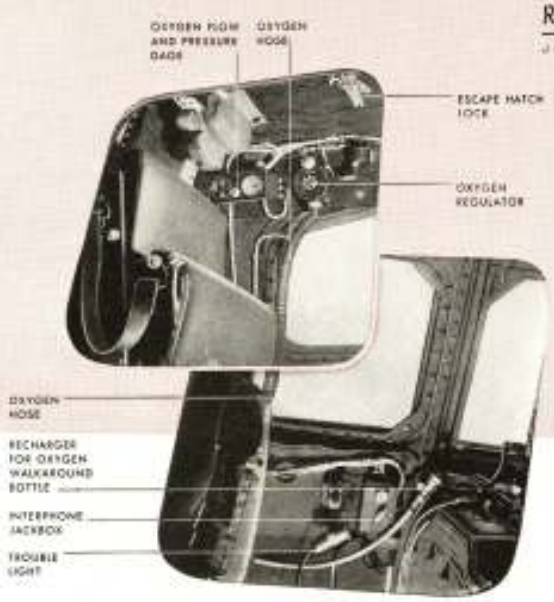
The black box at the bottom left is the tail gunner's control box. The hose for the oxygen mask is prominent while the silver grey box (middle right) is an interphone control box.

Bottom Right: The right hand side of the tail gunner's compartment (left hand side of plane). (***Scott Willey***)

The window is part of a jettisonable panel that is the tail gunner's escape hatch. The black box at the bottom of the photo is the servo amplifier for the tail turret.

Note the darker green circular panel embedded in the padding (lower left, above the servo amplifier). This is the tail gunner's ash tray (made by the Ford motor car company) – similar devices can be seen at all other crew positions.

HOW TO TURN ON THE TAIL SIGHTING STATION



Upper photo: Seat as seen looking toward ceiling; Lower photo: Seat as seen looking down.

FACTS AND FIGURES

Movement of the Tail Gunner's Sight

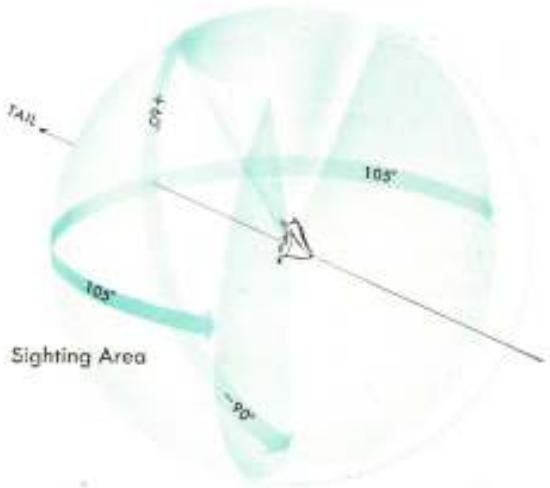
The tail gunner can turn his sight more than half way back toward either side (105 degrees from the center-line in either direction). In elevation, he can sight all the way from straight down (—90 degrees) to two-thirds of the way up (60 degrees). This is much farther than his guns can follow.

Turret He Has First Call On

The tail gunner has first call—primary control—on the tail mount. When he is not using it, control passes to one of the side gunners.

Other Turrets He Can Operate

None.



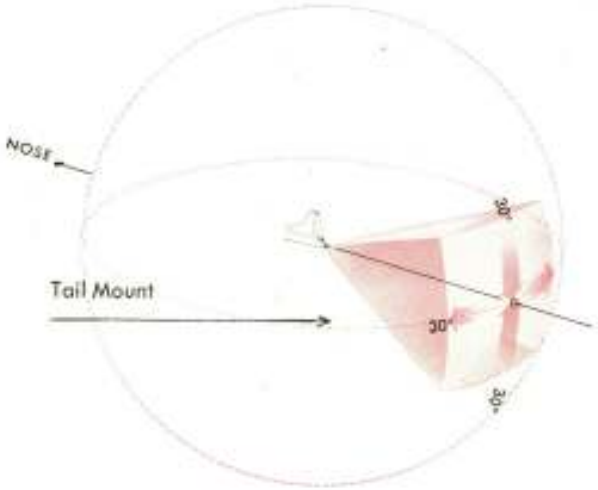
Sighting Area

Field of Fire of His Turret

The tail mount guns move a third of the way up (30 degrees), a third of the way down, and a third of the way toward either side.

Stowing Duties

The tail gunner stows his tail mount with its guns pointing back and a little above horizontal.



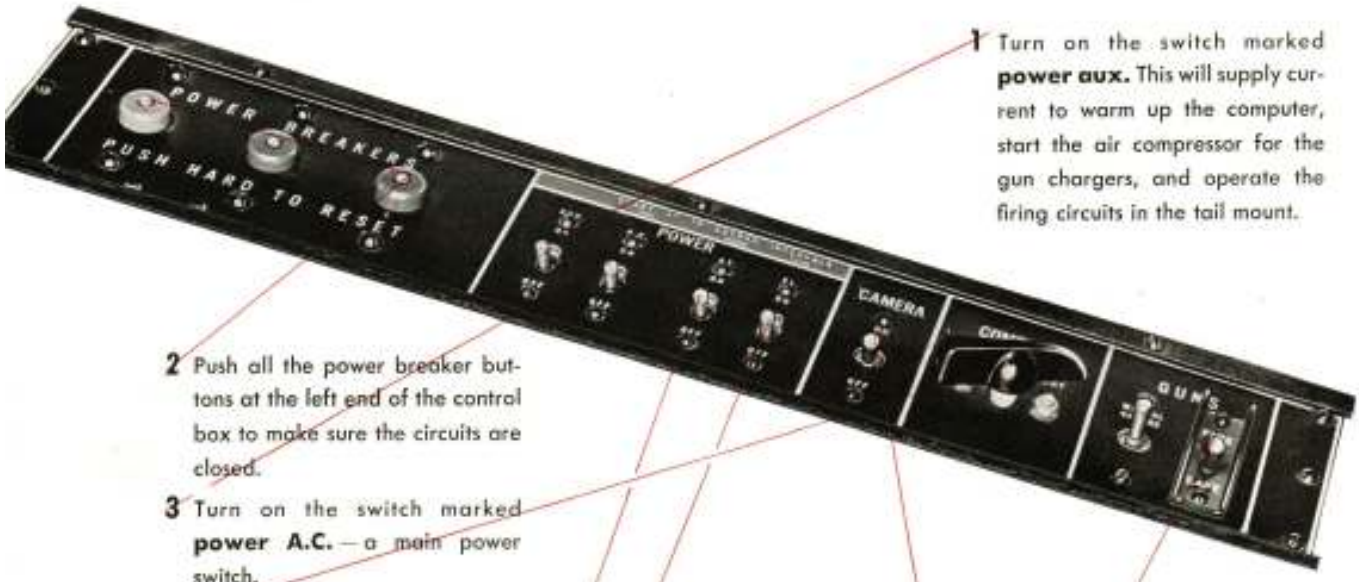
Tail Mount

RESTRICTED

This page and next: Two pages from the USAAF publication 'Air Forces Manual No. 27 Gunnery in the B-29' relating to the tail gunner's sighting station and switches. (***Taigh Ramey***)

THE TAIL GUNNER'S SWITCHES

The tail gunner's control box is located just to the left of the seat.
To start operating the tail mount, take the following steps in order:



1 Turn on the switch marked **power aux.** This will supply current to warm up the computer, start the air compressor for the gun chargers, and operate the firing circuits in the tail mount.

2 Push all the power breaker buttons at the left end of the control box to make sure the circuits are closed.

3 Turn on the switch marked **power A.C.** — a main power switch.

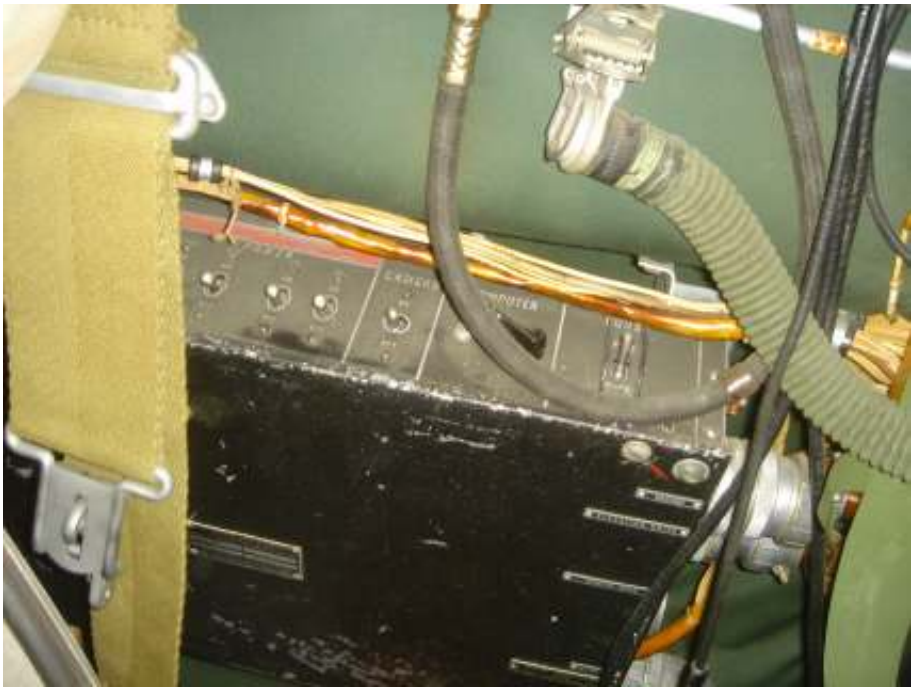
4 Turn on the **computer** switch, which starts the computer and the gyroscopes on your sight. Now wait at least 10 seconds to avoid overloading the circuits. Use the 10 seconds to check your sight, as described on page 5-7-1.

5 Next turn on the switch marked **power az.**—which supplies current for moving the turret in azimuth.

6 After another 10-second wait, turn on the switch marked **power el.** — which supplies power for moving the guns up and down. (The equipment for moving the tail mount requires so much electricity that two switches are provided to avoid a sudden drain on the power system.)

7 The other switches can be turned on in any order you wish.
The **guns** switch is a safety switch for the firing circuit in the tail mount; on the ground it should be turned on just before testing the triggers, and in the air it should be turned on just before firing test rounds and then left on for the rest of the mission. The **camera** switch provides power for operating the tail gun camera. (If your sighting station has a **manual charge** switch, ignore it unless you receive special instructions—the equipment it operated has been removed from most B-29s.)

You are now ready to operate the sight and guns, as described in Section 3. The tail guns will follow your sight and fire when you press your triggers. You can fire the 20 mm cannon along with the caliber .50s by turning on a small toggle switch mounted near the sight. (For instructions on when to use the 20 mm, see page 4-4-1.)
As soon as you let go of the action switch on your sight (described on page 3-1-2), control of your guns will pass to one of the side gunners.



Top: Looking down to the left of the tail gunner's seat (right hand side of the aircraft). (***Scott Willey***)

The turret dynamotor that turned the airplane's 28 volts DC into 115 Volt 400 cycle AC is under the wooden cover by Scott Willey's foot. Below this is the ammunition tube while above the dynamotor and partly covered by the insulation padding is the tail gunner's control box.

A walk around oxygen bottle is also just visible under the oxygen hose. The smaller hose that ends at the centre top of the photo is for recharging the walk around oxygen bottle. The thin black wires are not original but are again parts of the fibre optic lighting system installed by the Smithsonian to show off their exhibit.

Middle: A close up of the tail gunner's control box in *Enola Gay*. (***Taigh Ramey***)

Bottom: The roof panel with the tail gunner's heated flying suit connector. (***Scott Willey***)

The top of the gun sight is at the very bottom while the gunner's heated flying suit connector is the black panel attached to the roof.

Unlike the gunners at the other sighting stations, the tail gunner could only control the guns in his own turret. However, this was simply because the field of view afforded the tail gunner was insufficient to allow him to sensibly take charge of any other turret. His sighting system still operated in exactly the same way as the others and hence, even though he was seated adjacent to his guns, his turret was still remotely controlled. The computer for the tail sighting station was located with those for the top and both blister sighting stations under the floor in the rear pressurised compartment (see also page 60).

Top: The tail gunner's pedestal gun sight. (***Scott Willey***)

A standard B-29 has four of these sights and one variation that fitted to a ring mount in the Central Fire Controller's blister. The Silverplate aircraft had just the one in the tail. The sighting window is at the top. The gunner's two hands gripped the wheels on the side. As he moved the sight in both elevation and azimuth; electrical and gyro components gave the General Electric computer both direction and rate of motion information. By turning the right wheel, the gunner adjusted the reticule to enclose the attacker's wingspan. This provided range information to the computer. The device sticking out from the left wheel is the dead-man's switch. It had to be depressed for the sight to work. If the gunner's hand left the wheel, the sight shut down. A diagrammatic representation of the sight is at page 58.

Middle: A close up of the sight. (***Scott Willey***)

The trigger is the rectangular button just inside the range wheel (knurled wheel to the right of the sight). There is a second trigger on the other side.

The interphone button is the circular button below and to the left of the trigger while the sight's data plate is below this. You can see from the data plate that this is a General Electric sighting station manufactured by the International Business Machine Corporation at Endicott N.Y.

Bottom: The twin 0.5 inch machine guns in *Enola Gay's* tail turret.
(***Chris Howlett***)

Note the discharge chute for the spent links and shell cases under the guns. The small circle above the tail gunner's rear window is the bombing light. Under the discharge chute is the formation light. Also visible is the escape hatch.

Back cover: The nose art of *Enola Gay* and *It's Hawg Wild* (***Chris Howlett***)


IT'S
HAWG WILD


ENOLA
GAY
NO SMOKING WITHIN
100 FT.