AIRCRAFT

PROFILE

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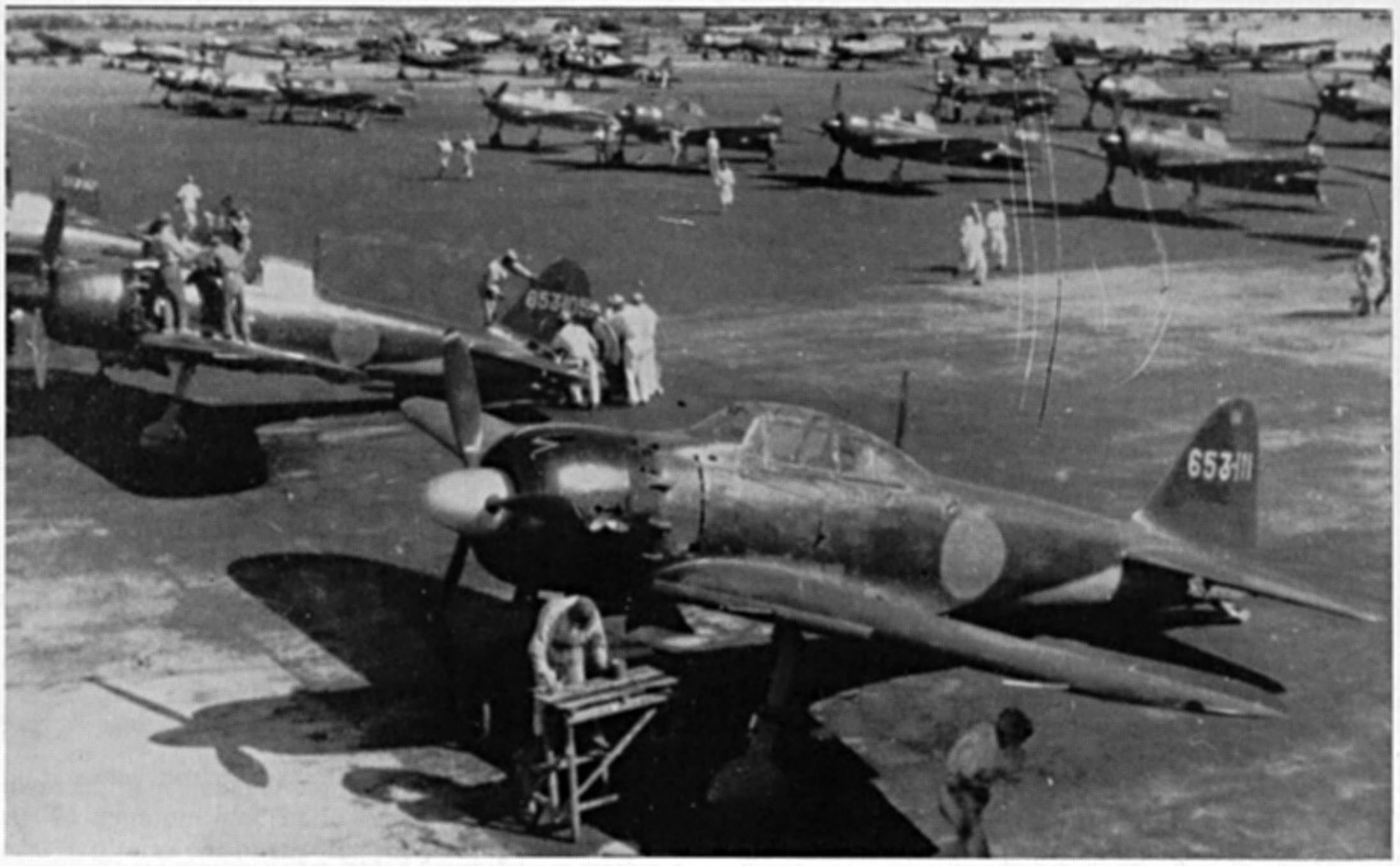
Mitsubishi A6M5 to A6M8 'Zero-Sen' ('Zeke 52')

40p

by M. C. Richards and Donald S. Smith



Compare this vista of plenty with the singular A6M5 below. Photographed on October 13, 1944 at Ohita Air Base, Japan, Zero-Sen, *Model 52a (A6M5a) fighters of the 653rd Naval Air Corps are being readied preparatory to embarking on the ill-fated Imperial Japanese Navy carriers which took part in* Operation Sho*—the Battle of Leyte Gulf—two weeks later.* (Photo: via Takeshi Miyawaki)

Mitsubishi A6M5 to A6M8 Zero-Sen ('Zeke 52')

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'The pride of Japan's aviation industry is the carrier-based Zero aircraft.'

Major-General Minoru Genda (Former Chief of Staff, Japanese Air Self Defense Force)

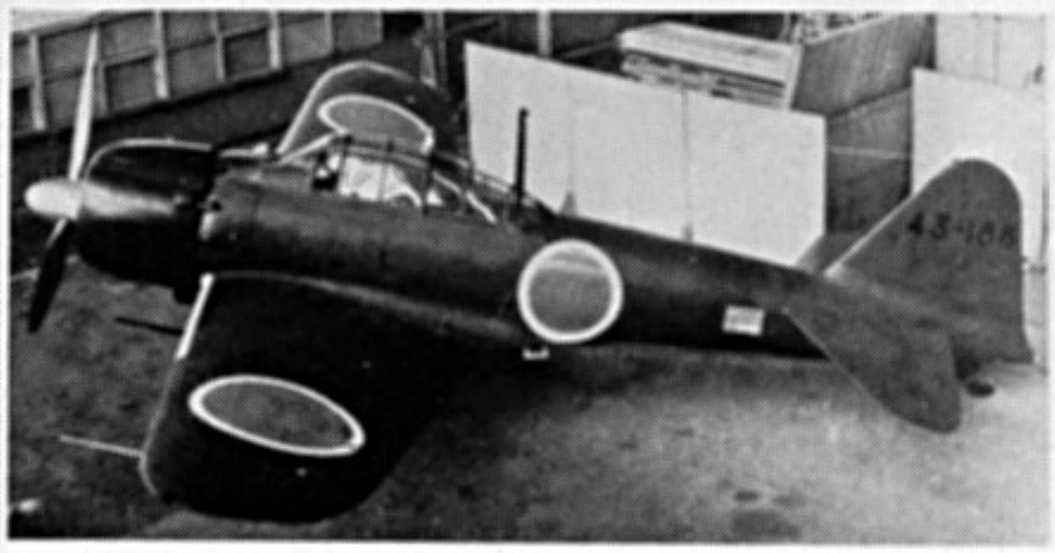
June 19, 1944 was the day when the great carrier battle of the Philippine Sea began. Twenty years later, one of the aircraft which took part in the countless engagements on that day, a Mitsubishi A6M5, Model 52 (Allied code: 'Zeke 52'), serial number 4685, was to prompt Major-General Genda to make the above-mentioned tribute.

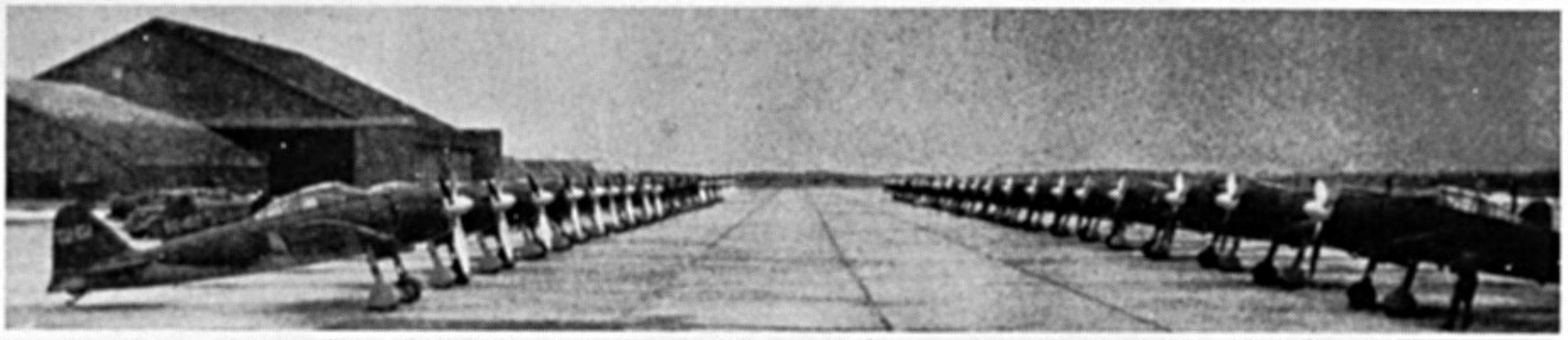
Flying his *Zero-Sen* (No. 4685) on that day was Lieutenant-Commander Nobuya Ozaki, attached to the 343rd Naval Air Corps, Imperial Japanese Navy Air Force. With others of this fighter unit, Nobuya Ozaki closed on a formation of U.S. Navy Grumman F6F Hellcats.

In the ensuing skirmish, Ozaki accounted for two of the F6Fs and then had to disengage because of battle damage to his own fighter. Eventually, he managed a desperate emergency landing in a jungle swamp on the island of Guam, in the Marianas. A Japanese soldier helped him from the crash but his injuries were so severe that Ozaki died after being taken to the nearest medical aid station.

The wreck of *Zero-Sen* No. 4685 lay hidden in the thick jungle for many years. Then, in 1962, Japanese newsmen visiting the 3rd Air Division in Guam heard of the discovery of the wreck and asked to see it. With the knowledge that no single example of this most famous of their aircraft remained in Japan, the Governor of Guam asked for a legislative bill to return the fighter to Japan. It was recovered by the U.S. Navy —from a swamp near Agana City where it had fallen—

Twenty years on . . . This immaculately rebuilt Zero-Sen, *Model 52 (A6M5) was ceremoniously presented to the Japanese Air Self Defense Force at a base near Tokyo on November 3, 1964, by the Governor of Guam.*
(Photo: Mitsubishi via Major Robert C. Mikesh)





Zero-Sen *fighters of the land-based 252nd Naval Air Corps at Misawa Air Base, northern Honshu, in May 1944. Shortly afterwards, the 252nd NAC was despatched to the island of Iwo Jima. Facing each other are Model 52s (left) and Model 21s.*
(Photo: Kazuo Tsunoda via Yasuho Izawa)

and airlifted by a Lockheed C-130 Hercules—*Profile No. 223*—to Gifu City, in southern Honshu.

The unit markings still visible on the fin "43–188"—in accordance with the coding then used—confirmed that the aircraft had come from the 343rd Naval Air Corps (the first digit being omitted), while of the three digits following the dash, the figure "1" identified the type as a carrier-based fighter and the remaining "88" as the number within the Naval Air Corps for this type. A small placard on the port side of the rear fuselage confirmed even more detail of its history. The serial number 4685 showed it to be the 35th production aircraft of this series of *Zero-Sen* to enter combat service —and that this was one of the 3,500 aircraft built by the parent company Mitsubishi (after adding sub-contractors construction, in all, well over 10,000 *Zero-Sens* were built). Marked in Japanese characters was the official designation *"Type Zero, Aircraft-Carrier Fighter, Model 52"*. This data enabled the origin of the aircraft and its pilot to be traced.

On November 3, 1964—the 10th anniversary of the post-war Japanese Air Self Defense Force (JASDF)—at a ceremony at Iruma Air Base, near Tokyo, the A6M5 was by now painstakingly restored to its original state. It was presented to the JASDF by the Governor of Guam on behalf of the U.S.A. More than 50,000 people watched as six U.S. airmen ceremoniously rolled the fighter from the hangar for the official presentation.

Major-General Minoru Genda—a former *Zero-Sen* pilot and once JASDF's Chief-of-Staff and now a member of the National Diet—concluded the ceremony with the following words, which in themselves form a fitting epitaph to a great fighter: *'The pride of Japan's Aviation Industry is the carrier-based Zero aircraft. I sincerely hope that this Zero will help the younger generation to recall the great task accomplished by their predecessors and pursue the future with the same spirit'.*

THE TURN OF THE TIDE

On February 7, 1943, the last Japanese soldier was evacuated from the island of Guadalcanal in the Solomons. This final withdrawal marked the end of a long and bitter struggle by the Japanese to retain the island following the first American landings during the previous August.

At sea and in the air around Guadalcanal, the main Japanese counter-offensive had been mounted by the Imperial Japanese Navy. It was in the skies over the Solomons that the *Zero-Sen* fighter of the IJN Air Force—which had spearheaded the Japanese air offensive during the first six months of the Pacific War—began to lose its effectiveness.

In some respects, this reduction of fighting efficiency was due to the loss of experienced fighter pilots. The Imperial Japanese Navy Air Force had tended to rely upon an elite corps of aircrew to gain air supremacy. However, with combat losses this highly-trained and combat-hardened corps began to decline in numbers; and the replacements were not as proficient as their predecessors. Also, increased losses in IJNAF aircraft could be related to the improving efficiency on the part of the US Navy and Army fighter pilots and their aircraft.

In spite of the introduction—in mid-1942—of improved variants of the *Zero-Sen*, the Models 22 and 32 *(Profile No. 190)*, the Japanese front-line aircraft losses began to mount. Already the US Navy fighter pilots flying the Grumman F4F-4 Wildcat fighter—

Study in refinement. (Left) *The shape of 1941, just prior to the attack on Pearl Harbor. A* Zero-Sen, *Model 21 (A6M2) on the flight deck of IJN* Akagi *anchored in Hitokappu Bay, Japan. The 'last-two' of the aircraft's number (in full, A1-158) appears both on the motor cowling ventral intake and on the main undercarriage covers. This early variant's aileron mass balance is well in evidence.* (Right) *A Model 52c (A6M5c) in late 1944 shows the revised engine cowling, gills, exhaust stubs and the increased wing armament of two 20-mm. cannon and two (outboard) 13-mm. machine-guns.*
(Photos: via Takeshi Miyawaki)

A striking close-up of a Zero-Sen, *Model 52c (A6M5c) clearly illustrating the complex curves of the welded-steel exhaust stubs and cut-out gills of the Nakajima* Sakae, *Model 21 two-row radial. Behind the stencil-marked cowling can be seen the characteristic hump (embracing the windshield) which formerly housed two machine-guns. In the Model 52c, only one 13-mm. Type 3 heavy machine-gun was installed. But the wing armament was increased by two more heavy-calibre m-gs., each being situated outboard of the 20-mm. cannon.*

which had proved a relatively easy kill for the *Zero-Sen,* Model 21 *(Profile No. 129)*—had begun to use tactics which minimized the IJNAF fighter's advantages. These tactics had evolved from the capture of a *Zero-Sen* Model 21 during the Aleutians campaign in June 1942. When tested by the US Navy, the Model 21 had revealed poor diving qualities, together with the lack of armour protection. In order to take full advantage of these revealed weaknesses in performance, Allied fighter pilots evolved the 'dive-and-hit' tactics in which the *Zero-Sen* was placed at a distinct disadvantage.

By early 1943, production in the Japanese aircraft industry was already having difficulty in covering the mounting losses sustained by the two Japanese air forces. On the other hand, production in the US aircraft plants was beginning to be stepped-up, not only in quantity but also in quality of product. This fact was realized early in 1943 when the US Navy introduced the Chance Vought F4U-4 Corsair fighter *(Profile No. 47)* in the Solomons area of the Pacific operations. This cranked-wing fighter was not only faster in level flight than the *Zero-Sen,* but also, in a dive, could easily outstrip the Mitsubishi. Moreover, the Corsair

One for the album. The Commanding Officer (Flying) of the shore-based 203rd Naval Air Corps' No. 303rd Fighter Squadron, Lieutenant-Commander Kiyokuma Okajima, IJNAF., is seated for a formal photograph taken at Kagoshima Air Base, southern Kyushu, in May 1945. In the background is his Zero-Sen, *Model 52b (A6M5b). Under the starboard mainplane can be seen the attachment points for four 30-kg. rocket projectiles—a feature more usually associated with the Model 52c.* (Photo: Kiyokuma Okajima via Yasuho Izawa)

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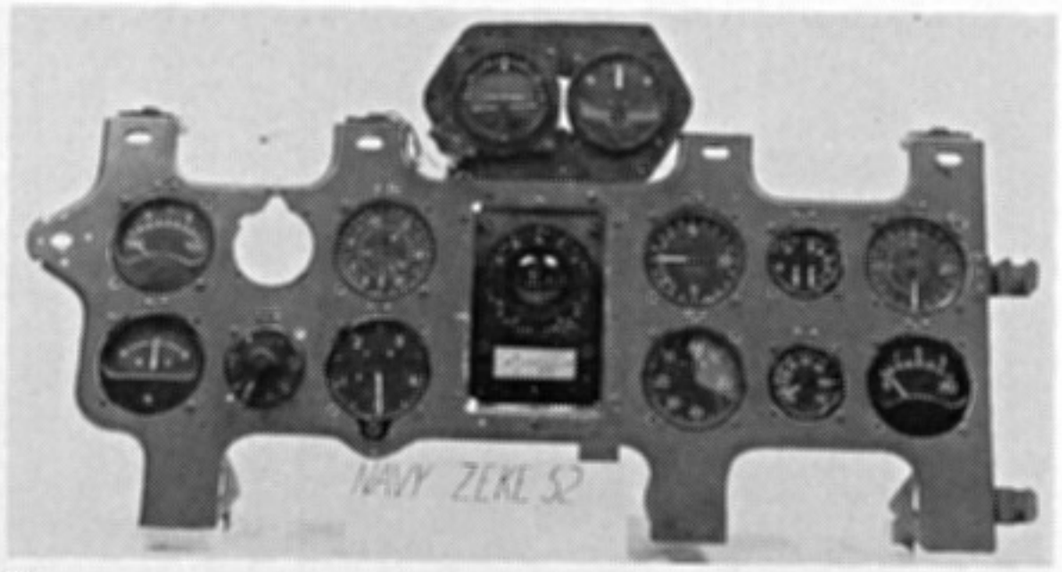

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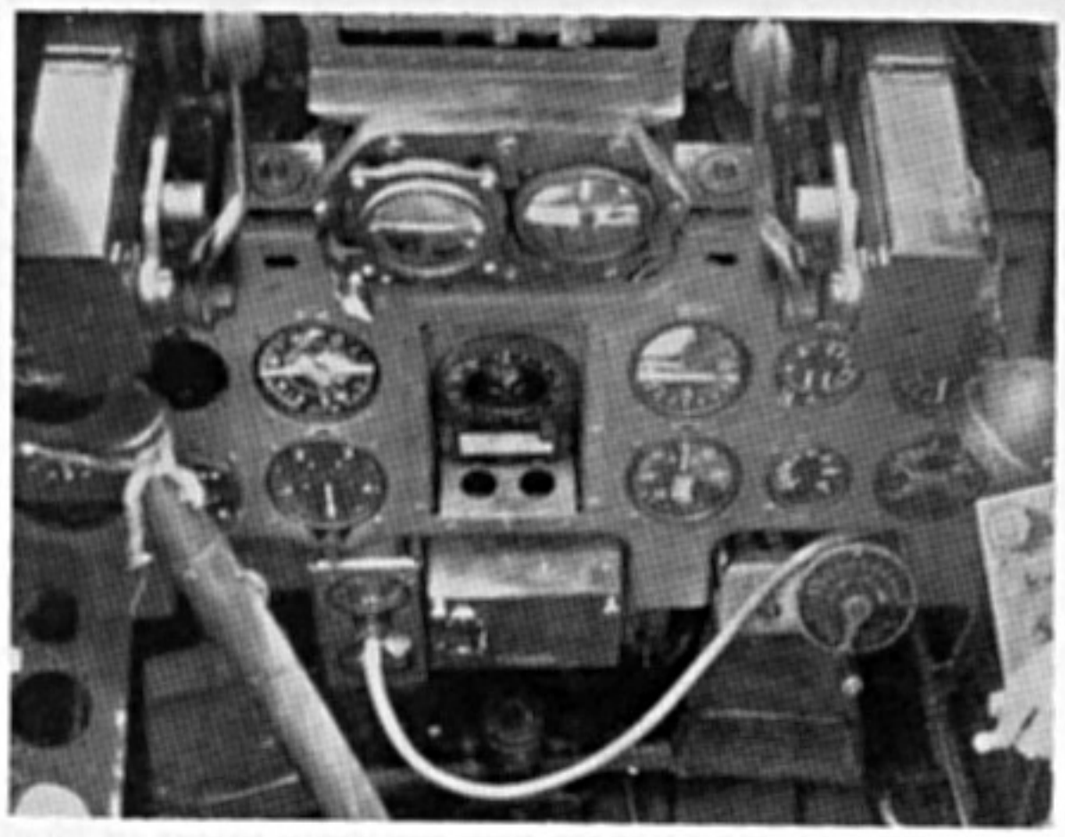

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1. *Cowling scoops, propeller and main undercarriage details show up well in this frontal view of a* Zero-Sen, *Model 52b.*
(Photo: *Koku Fan)*

2. *Main instrument panel of a Model 52. The U-shaped cut-outs above the left and right banks of instruments permit access to the two 7,7-mm. machine-guns (Model 52|52a).*
(Photo: US Navy Dept., National Archives, ref. 80–G–192574)

3. *Forward view of cockpit showing 7,7-mm. machine-guns in position.* (Photo: *Koku Fan)*

4. *Right-hand view of Model 52 cockpit.* (Photo: *Koku Fan)*

5 & 6. *Although of poor quality for reproduction, these photographs do illustrate the centreline long-range drop tanks used by the 'Zeke 52'. No. 6 shows pilot has raised seat prior to taxiing.*

(Photos: US Navy Dept., National Archives, ref. 80–G–169249 169252)

6

carried greater firepower and incorporated extensive protection from enemy fire.

Now it was the turn of the Japanese Navy pilots to begin demanding fighters which would be capable of retaining the air superiority experienced by the IJNAF in the first year of the Pacific War.

DEVELOPMENT OF ZERO-SEN FINAL VARIANTS

The IJNAF had already foreseen that a successor to the *Zero-Sen* would be required. Accordingly, in 1940, the Mitsubishi organization received a design specification from the IJN for a new Carrier Fighter.

At this point of time, however, the Mitsubishi design office was fully occupied with as-yet unsolved engineering problems relating to a previously issued interceptor-fighter specification in the *14-Shi* series. Accordingly, Mitsubishi requested that the new 1940 specification for the *Zero-Sen* replacement be shelved for the time being. Meanwhile, the design engineers persevered with the troublesome *14-Shi* interceptor-fighter. Although a small number of prototypes was available in 1942–43, the IJN's J2M *Raiden* (Thunderbolt; Allied code 'Jack') failed to achieve service status until 1944—and then only in limited numbers.

Two years after the 1940 shelving, Mitsubishi was once more in receipt of a *Zero-Sen* replacement requirement. This was issued by the IJN as a *17-Shi* project for an Experimental Carrier Fighter. This eventually evolved into the A7M *Reppu* (Hurricane; Allied code: 'Sam').

As the Mitsubishi design team progressed with the *Zero-Sen* replacement, the advent of the US Navy's F4U Corsair in the Pacific in 1943 showed that this new fighter was not going to be forthcoming soon enough to make recovery of air superiority a practical proposition. In fact, the A7M1 prototype did not undertake its first flight until May 6, 1944.

In the meantime, the US Navy had introduced the Grumman F6F-3 Hellcat which was not only capable of taking on existing models of the *Zero-Sen* in the hitherto perilous adventure of 'dogfighting' but also, like the F4U Corsair, had the advantages of high top speed and diving margins, overall rugged construction, armour and fuel tank protection. In fact, the only remaining asset of the existing *Zero-Sen* was its remarkable combat radius.

The only recourse for the IJNAF was to instruct Mitsubishi to modify the *Zero-Sen* still further in order to boost performance so that the A6M could once more be on equal terms with the formidable US Navy newcomers.

Zero-Sen Model 52 prototype. In the summer of 1943, *Zero-Sen* No. 904 (an A6M3, Model 32) was diverted from the Mitsubishi production line and subjected to the modifications supervised by engineer Mijiro Takhashi who had taken over this fighter's design development from Jiro Horikoshi in late 1941—to free the latter so that he could concentrate on the *14-Shi* (J2M *Raiden*) interceptor project.

Engineer Takhashi concentrated on improving the critical diving performance by 'beefing-up' the mainplane. He added a thicker gauge metal wing skinning and rounded-off the Model 32's wingtips. The ailerons were faired into the wingtips and the tip folding mechanism was dispensed with altogether—the mechanism had been retained in production models long after the earlier wingtips had been deleted to save production time.

The 1,100 h.p. Nakajima *Sakae* (Prosperity) Model 21 air-cooled, 14-cylinder, two-row radial was retained but improved, ejector-type exhaust stubs were incorporated. The Model 32's armament of two 7·7-mm. machine-guns and two 20-mm. cannon was also retained.

These modifications added another 200 kg. (440 lb.) to the all-up weight but the new model—A6M5, Model 52—attained a favourable 305 knots at 6,000 metres (351 m.p.h. at 19,685 ft.). Better still, the maximum diving speed was increased to 356 kt. (410 m.p.h.). This was what the service pilots of the IJNAF had been pressing for, because on many occasions almost certain "kills" had been lost because of their adversaries' superior diving speeds.

The new *Zero-Sen* was accepted by the IJNAF after service trials with the prototype which had begun in August 1943. The new model was designated as the Mitsubishi A6M5, Type O Carrier Fighter, Model 52 (Allied code: 'Zeke 52'). From that month onwards, Mitsubishi began to manufacture no fewer than 747 Model 52s—the largest quantitity of any variant of this carrierborne fighter. The Model 52 was also built by Nakajima during 1943–44—the exact total is undetermined—and Hitachi was also scheduled to produce the A6M5 but, because of production snags, that company was unable to complete even one Model 52 before the Pacific War ended.

A6M5a, Model 52a. Projected late in 1943, this model was developed in parallel with the first Model 52. An even heavier gauge wing skinning permitted the maximum diving speed to increase by 12½% to 400 kt. (460 m.p.h.) and just 20 m.p.h. slower than the rugged F4U Corsair of the US Navy. This was to be the highest diving speed attained by any *Zero-Sen* variant and the Mitsubishi design engineers were satisfied with this considerable narrowing of the performance gap.

For the Model 52a, additional firepower was effected by adopting the belt-fed 20-mm. Type 99 Model 2 Mark 4 cannon in the wings. This added another 25 shells per gun over the earlier drum-fed Type 99s which had only 100 shells per gun.

From March 1944 onwards, Mitsubishi turned out 391 A6M5as while the total of Model 52as produced by Nakajima is—once again—undetermined.

A6M5b, Model 52b. Alongside the A6M5a, the A6M5b was progressively developed as a joint project of Mitsubishi and the IJN whose engineers were charged with the responsibility of building into the *Zero-Sen* a fighter which would provide cover while delays in the J2M ('Jack') and A7M ('Sam') programmes were overcome.

The improvements agreed upon early in 1944, as a result of the combined design study, brought combat protection to the fore for the first time. The fuel tanks were to be fitted with automatic fire extinguishers of the carbon-dioxide (CO_2) type. Hitherto, the *Zero-Sen* had been a very inflammable 'fire-trap' when hit. Also, for the pilot, a new windshield was provided. This comprised of two layers of plastic between glass outer-sections and was 50 mm. (2 in.) in thickness. For greater firepower, one of the two fuselage-mounted 7,7-mm. Type 97 machine-guns was replaced by a

A crudely simple but effective 'in-the-field' mobile refueller for the Zero-Sen, *Model 52.*
(Photo: US Navy Dept., National Archives, ref. 80–G–169292)

13-mm. Type 3 machine-gun.

Production started to flow in April 1944, and sufficient numbers were available to equip the IJNAF units resisting the US Navy in the amphibious operations to capture the islands in the Marianas. The Model 52bs were no match for the F6F Hellcats and what had begun on June 19, 1944, as the Japanese *Operation "AGO"* ended victoriously for the Americans as the *"Marianas Turkey Shoot"*.

From 1944 onwards, Mitsubishi turned out 470 Model 52bs.

A6M5c, Model 52c. In little more than a month after the *Operation "AGO"* reverse, the IJN issued yet another *Zero-Sen* improvement specification. The order, dated July 23, 1944, called for more pilot-protection—for the first time, a toughened-steel plate was to be installed behind the pilot—and greater range and more offensive weapons.

The range was to be advanced by 104 nautical miles (to 1,141 n.m. at 200 kt.) by installing a 70-litre self-sealing tank behind the pilot's seat and armour-plating. Armament was to be augmented by installing a 13-mm. Type 3 machine-gun in each wing outboard of the single 20-mm. cannon. The Model 52b's 13-mm. machine-gun firing through the propeller disc was to be retained but the fuselage-mounted 7,7-mm. m.g. was to be omitted.

For the first time, too, provision was to be made for underwing carriers for rocket projectiles of the air-to-air variety.

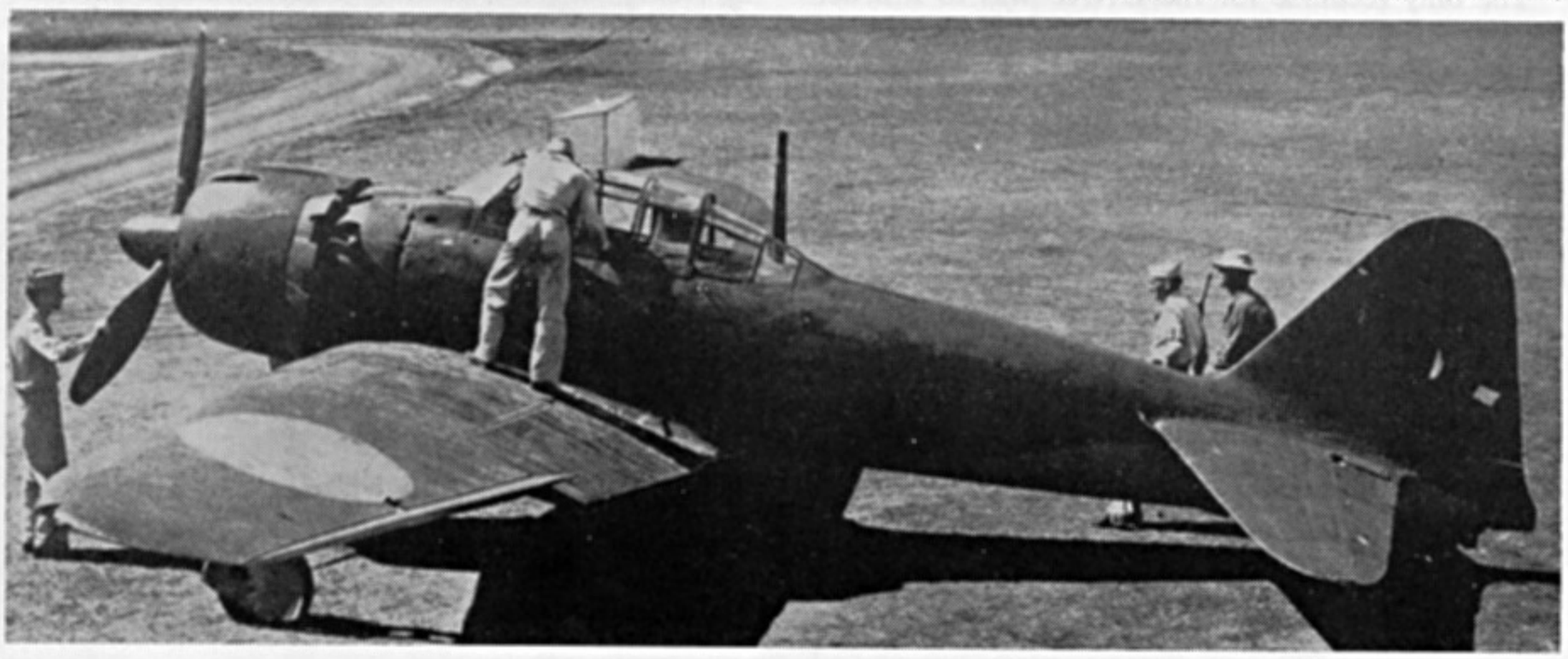
When Mitsubishi examined this new specification—for what would be, ultimately, the A6M5c, Model 52c—the implications were obvious. The increased all-up weight penalty could only be countered by greater engine power output—especially as the IJN insisted that the diving speed of 400 kt. be maintained.

The company proposed to the IJN that its own Mitsubishi *Kinsei* (Golden Star) Model 62 air-cooled, 14-cylinder, two-row radial would fit the bill. At 2,100 m., the *Kinsei 62* offered an additional 240 h.p. (1,340 h.p.) over the *Zero-Sen's* standard 1,100 h.p. *Sakae* 21. The IJN dictated otherwise and stated that the *Sakae* was to be retained and would be adequate if a water-methanol injection system was fitted to provide short-duration combat-emergency power output.

Design engineer Eitaro Sano, heading a small team, was sent to the IJN's Naval Air Research & Development Center to assist navy technicians in incorporating the Model 52c modifications. It was found that the water-methanol *Sakae*—the Model 31A—was not ready for installation. Nor had the self-sealing tanks been fitted; this being because of the IJNAF ground-crew's lack of experience in dealing with this type of tank.

In service, the performance of the *Sakae* 21-powered A6M5c was, inevitably, disappointing. Also, the Model 52c suffered from some loss in wing strength, thus limiting maximum diving speed. To overcome this deficiency, the wing skinning gauge was

Under armed guard. A captured Zero-Sen, *Model 52 (A6M5) on Peleliu (Palau Is.) in the Carolines, which appears to be in undamaged state.*
(Photo: US Air Force, National Archives)



War in the Pacific. A heavily battle-damaged Zero-Sen, *Model 52, with part of the rear fuselage and rudder missing, still managed to alight on an island lagoon. This 'Zeke 52' served with the land-based 252nd Naval Air Corps.*
(Photo: USN Dept., National Archives, ref. 80–G–191432)

increased yet again, especially in the areas around the gun-bays.

During 1944, Mitsubishi produced 93 Model 52cs. **A6M6c, Model 53c.** In November 1944, the water-methanol *Sakae* Model 31A became available and Mitsubishi installed this new radial in an A6M5c airframe. The emergency power system proved erratic, performance suffered and other problems were experienced.

Apart from Mitsubishi's sole example of the A6M6c, Nakajima turned out a small quantity at their Koizuma plant in late 1944 and early 1945.

A6M7, Model 63. This was a fighter-dive-bomber variant which had the same armament as the A6M5c but, in place of the normal centreline jettisonable auxiliary fuel tank, the Model 63 supported a 500 kg. (1,100 lb.) or 250 kg. (550 lb.) bomb on a Mitsubishi-designed bomb-carrier. In place of the 330-litre (72 Imp. gal.) centreline drop-tank, two wing-mounted 150-1. (33 Imp. gal.) drop-tanks were provided. In addition, for dive-bombing, the tailplane was strengthened.

Hitherto, in the June 1944 *Operation "AGO"*, the *Zero-Sen* had been employed in small numbers as

Fighter ace. Naval Air Pilot, 1st Class Takeo Tanimizu inspects the victory marks on his Zero-Sen, *Model 52c (A6M5c) at Kagoshima Air Base, southern Kyushu, in March 1945. He was attached to No. 303 Fighter Squadron of the 203rd Naval Air Corps and his Model 52c carried the tail numbers (in white) 03–09. The arrows through the U.S. white stars indicates confirmed "kills". The black stencilled rectangle bears the following data: (top line)* Type 0 Single Seat Carrier Fighter Model 52c; *(2nd line)* Nakajima Number 32,374— *indicating Nakajima Hikoki K.K. manufacture; (3rd & 4th lines) names of ground crew chief and armourer. Also rarely illustrated in close-up is the normally retracted footrest in the wingroot fillet. The handgrip is also visible at 11 o'clock outwards from the red* Hinomaru.
(Photo: Takeo Tanimizu via Yasuho Izawa)

fighter-bombers—the local modifications being undertaken by IJNAF ground crews to accommodate a 250-kg. bomb. The reason for these conversions was that the newer, fast dive-bombers of the IJNAF had difficulty in operating from the restricted decks of the Light carriers. Although the *Operation "AGO"* fighter-bombers had little success, some of these converted *Zero-Sens* found their way to the Philippines. There, in the autumn of 1944, they were expended in the first *Kamikaze* strikes against the U.S. Fleet. Subsequently, many of the A6M7s also suffered the same fate in the closing months of the Pacific War.

The A6M7 was manufactured from May 1945 onwards by Mitsubishi and Nakajima but the precise totals produced by each company are not known.

A6M8c, Model 54c. Factors determining the progress of the A6M8c fairly related to the urgent but hitherto unsatisfied need for increased basic power output—to offset the various weight penalties suffered by the most recent later variants of the *Zero-Sen*.

Although Mitsubishi had pressed for approval to employ their own 1,340 h.p. *Kinsei* Model 62, the IJN had not acquiesced. Then, in late 1944, Nakajima started to taper-off *Sakae* production in order to provide more facilities for their big 18-cylinder *Homare* (Honour) radial used in, for example, the IJNAF's Nakajima C6N *Saiun* (Painted Cloud; Allied code: Myrt) Carrier reconnaissance, or Land-based night-fighter. This cleared the way for the adoption of the *Kinsei* and, in December 1944, the conversion design study was started by a team led by engineers Eitaro Shiro Kushibe and Kazuaki Izumi.

The bigger diameter of the *Kinsei* dictated considerable redesign of the forward fuselage. In turn, the last remaining fuselage-mounted 13-mm. machine-gun was deleted and the *Zero-Sen*, for the first time, mounted wing armament only; two 20-mm. cannon and two outboard-positioned 13-mm. machine-guns. Increased combat radius was achieved by using two 350-litre (77 Imp. gal.) drop tanks, leaving the fuselage centreline carrier free for a 500-kg. (1,100-lb.) bomb. Service requirements included full power output for 30 minutes, and 2 hr. 30 min. at cruising speed. With a maximum speed of 309 kt. at 6,000 m. (356 m.p.h. at 19,685 ft.), the A6M8c was the fastest of all *Zero-Sen* variants.

Two A6M8c, Model 54cs were prepared for flight trials, the first making its initial flight on May 25, 1945. The second Model 54c was ready a month later. Once in the air, however, the Model 54c revealed tendencies of low oil pressure and engine overheating. By enlarging the oil tank and revising the pipe lines, and by fitting engine cooling baffles, these temporary snags were eliminated. At high altitude, also, a drop in fuel pressure was overcome by altering the fuel regulating valve.

A6M8, Model 64. The IJN's Yokosuka Naval Air Corps' test pilots who flew the A6M8c were in agreement that this was the best *Zero-Sen* yet produced. At the same time, the IJNAF made plans for ordering no fewer than 6,300 examples which were to have been the Model 64.

The Mitsubishi plants at Suzuka, Shinonosha and Omi, and the Nakajima airframe factories at Wakaguri, Shizura and Koizuna were all designated for production of the Model 64 but, by the surrender on August 15, 1945, none had been completed.

Key to colour illustrations

1 **Ya-115.** *Zero-Sen,* Model 52 (A6M5) of the Yatabe Naval Air Corps, Imperial Japanese Navy Air Force. Yatabe NAC was an advanced training unit based in Japan, 1944-45.

2 **TAIC 7.** A captured *Zero-Sen,* Model 52 (A6M5) stripped of paint. TAIC No. 7 was used by the Technical Air Intelligence Center in the U.S.A. (1944) for, among other things, aircraft recognition photography—which accounts for the pseudo markings.

3 **221-10 A.** Back to correct markings with a *Zero-Sen,* Model 52 (A6M5) of the 221st Naval Air Corps, No. 308 Fighter Squadron, August 1944.

4 **221-50 D.** Another A6M5 of the 221st NAC at the same period but attached to No. 407 Fighter Squadron.

5 **131-121.** A *Zero-Sen,* Model 52 (A6M5) of the 131st NAC which was flown by Naval Air Pilot, 2nd Class Koutaro Nagahama on February 16, 1945, to intercept US Navy carrier-borne aircraft.

A6M5-K, Model 22. This was a two-seat (in tandem) advanced fighter-trainer of the A6M5, of which the Sasebo Naval Arsenal undertook the project design. An earlier version of the *Zero-Sen,* the A6M2, Model 22, had been converted to this configuration—as the A6M2-K—and the experience thus gained was built into the A6M5-K.

Hitachi was assigned to this project but they managed to produce only a small experimental batch of seven A6M5-Ks early in 1945. Thereafter, the deteriorating course of the Pacific War placed the emphasis on front-line aircraft rather than lesser-priority aircraft.

A6M5, night-fighter modification. In a localized unit-level attempt to operate the *Zero-Sen* as a night-bomber interceptor, maintenance crews of the 302nd Naval Air Corps undertook an armament modification whereby a 20-mm. cannon was anchored obliquely to fire from a position behind the pilot.

A6M5 OPERATIONAL HISTORY

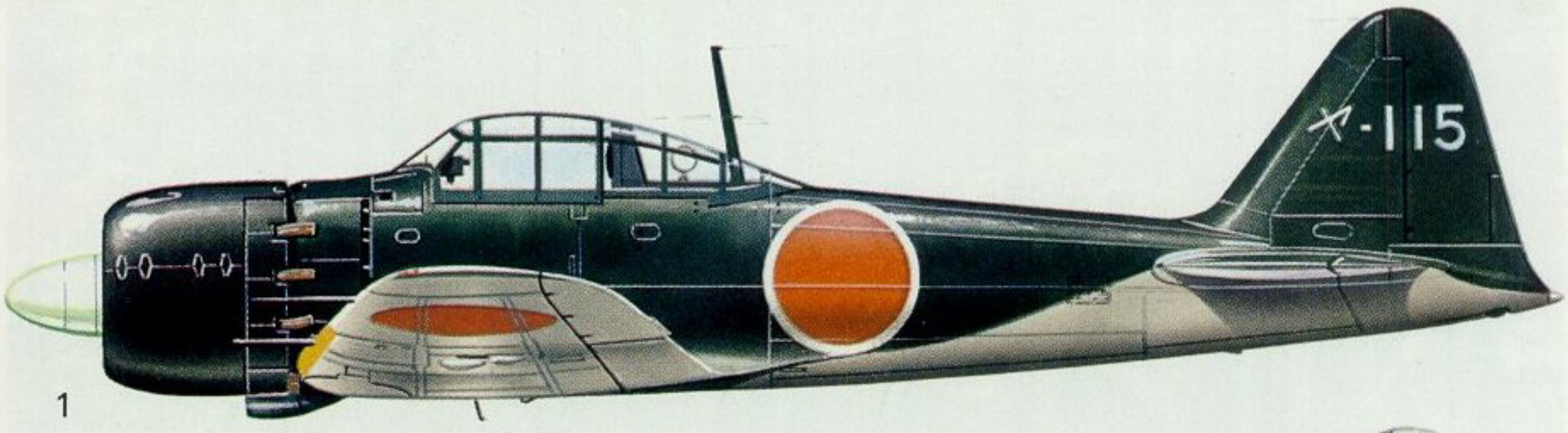
By the point in time when the Mitsubishi A6M5 *Zero-Sen* reached the production stage in March 1944, the tide of war had already turned against Imperial Japan. The era of virtually unchallenged air supremacy over the vastnesses of the Pacific had ended and the Japanese military machine was forced to be more and more on the defensive.

The first actions involving the A6M5 occurred in June 1944 with the advent of the Allied invasion of the Marianas. In preparation for the anticipated assault, the Imperial Japanese Navy Air Force possessed the biggest carrier fleet ever assembled by the IJN—accommodating some 450 combat aircraft in all.

Split into three groups, this fleet consisted of the 1st, 2nd and 3rd Carrier Divisions:

The 1st Carrier Division. Commanded by Vice-Admiral Jisaburo Ozawa*, this force contained the Fleet carriers, IJN *Shokaku,* IJN *Taiho* and IJN *Zuikaku.*

*Vice-Admiral Ozawa was overall commander of the First Mobile Fleet.



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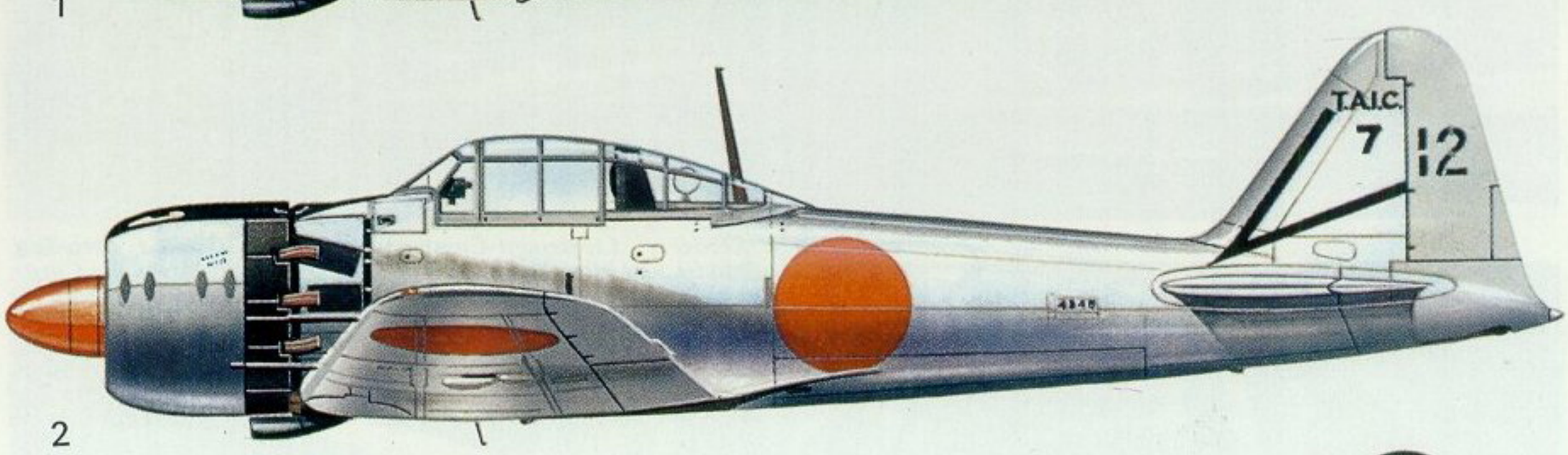

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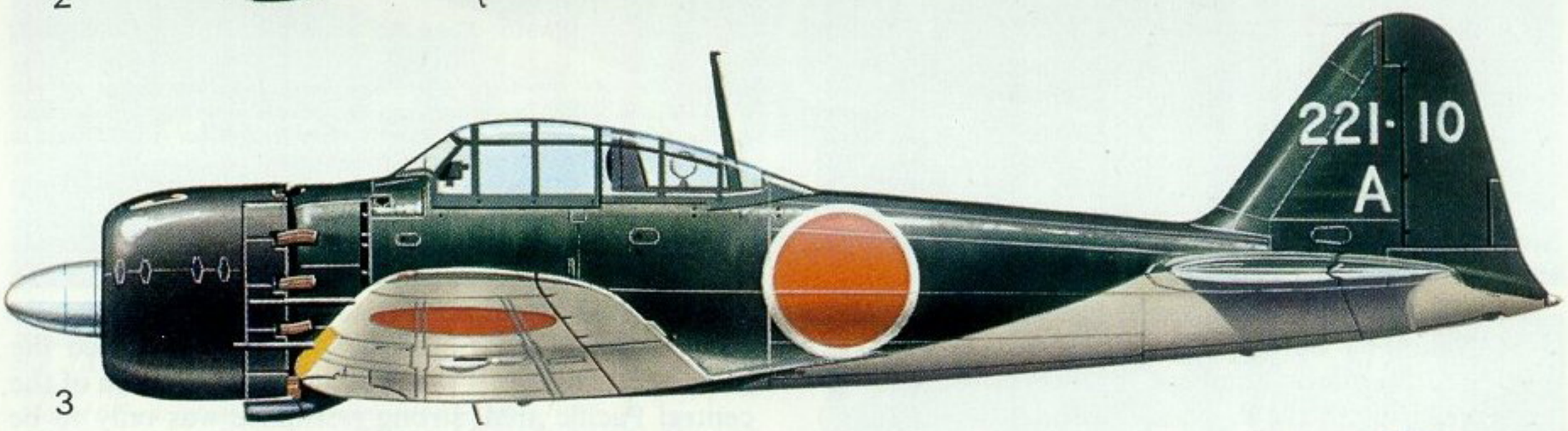

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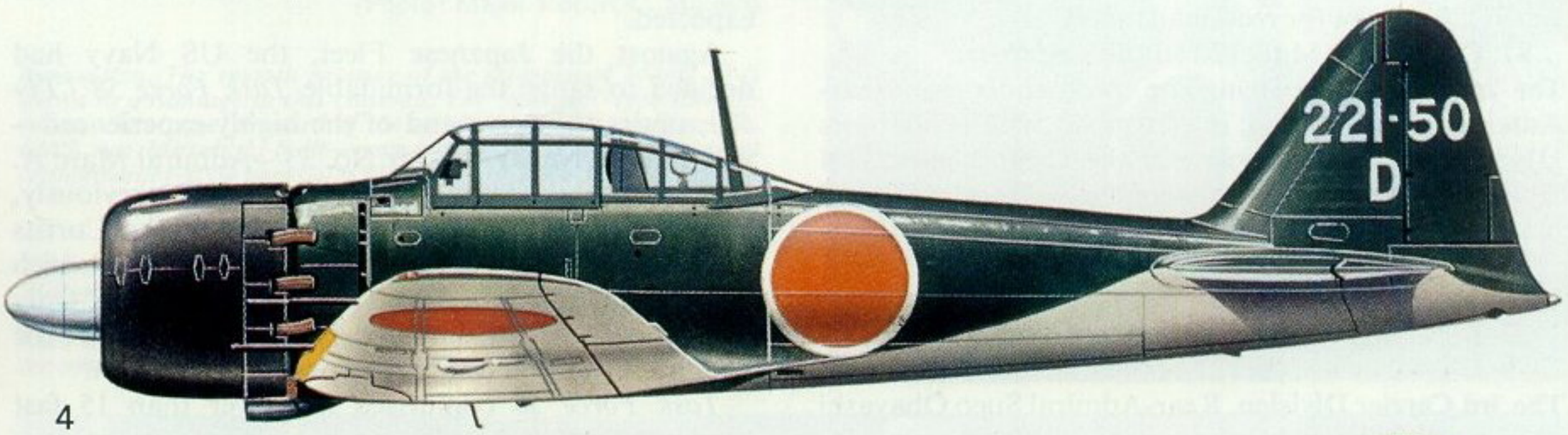

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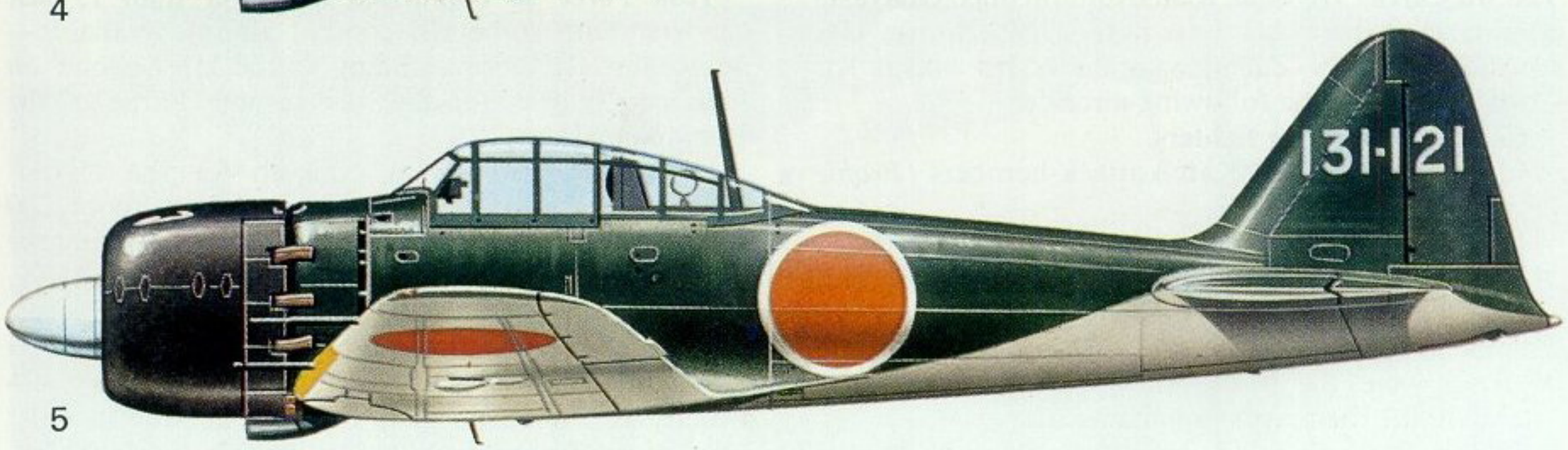

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Recovery. Lieutenant-Commander Nobuya Ozaki's Zero-Sen, *Model 52 (Mitsubishi No. 4,685) of the 343rd Naval Air Corps, which the mortally-wounded pilot managed to crash-land on the island of Guam on June 19, 1944 during the Battle of the Philippine Sea. Rediscovered in a swamp by US Navy telephone linesmen in 1962, No. 4,685 was eventually retrieved by a joint USN/USAF operation—shown here near the original site and mounted on a USAF truck trailer—and flown from Guam to the JASDF Gifu City base.*
(Photo: *Koku Fan* via Major Robert C. Mikesh)

Reflection. At the Gifu City, southern Honshu, depot of the JASDF, Zero-Sen *designer Jiro Horikoshi poses by the cockpit of the Model 52 No. 4,685 shortly after its arrival from Guam in 1962, 18 years after crashing into a swamp.*
(Photo: *Koko Fan* via Major Robert C. Mikesh)

Supporting aircraft on these three carriers came from the 601st Naval Air Corps and comprised:

81 Mitsubishi A6M *Zero-Sen* fighters.
54 Nakajima B6N *Tenzan* Model 12 (Allied code: 'Jill') attack-bombers.
9 Yokosuka D4Y *Suisei* Model 11 ('Judy') bombers for reconnaissance.
81 D4Y *Suisei* Model 22 ('Judy') bombers.

The 2nd Carrier Division. The commander was Rear-Admiral Takaji Jojima, in charge of the Fleet carriers IJN *Hiyo* and IJN *Junyo* and the Light carrier, IJN *Ryuho*. The ships' aircraft were drawn from the 652nd Naval Air Corps and included:

81 A6M *Zero-Sen* fighters.
27 Aichi D3A ('Val') bombers.
27 B6N *Tenzan* attack-bombers.
9 D4Y *Suisei* Model 22 bombers.

The 3rd Carrier Division. Rear-Admiral Sueo Obayashi commanded three Light carriers, IJN *Chitose,* IJN *Chiyoda* and IJN *Zuiho,* with the 653rd Naval Air Corps supplying the following aircraft:

63 A6M *Zero-Sen* fighters.
12 Nakajima B5N ('Kate') attack-bombers *(Profile No. 141)*.
6 B6N *Tenzan* attack-bombers.

Thus, there were no fewer than 225 A6M *Zero-Sens* —the only type of Carrier fighter then in use—aboard the nine IJN Fleet and Light carriers. Also, the majority of these were the new A6M5 model about to be 'blooded' for the first time in combat.

The Allies' objective for the invasion of the Marianas was to secure the islands of Tinian, Saipan and Guam so that the USAAF would have strategically-placed airfields for the successful operation of the new Boeing B-29 Superfortress heavy bombers—*Profile No. 101*. From here the B-29s would be able to hammer the Japanese home islands with strategic bombing missions. Since the Marianas provided the main headquarters for the Japanese domination of the central Pacific area, strong resistance was only to be expected.

Against the Japanese Fleet, the US Navy had decided to range the formidable *Task Force 58 (TF-58)*, under the command of the highly-experienced—and veteran Naval Aviator No. 33—Admiral Marc A. 'Pete' Mitscher, USN. Twenty-five years previously, 'Pete' Mitscher had been senior pilot of the Curtiss NC-1 flying-boat, one of four (NC-1 to NC-4) which in 1919 attempted the first transatlantic crossing. Only NC-4 (Lieutenant-Commander A. C. Read) made the final hop from the Azores to Portugal and Spain.

Task Force 58 comprised no fewer than 15 fast carriers* with some 900 combat aircraft available—approximately twice as many as the IJNAF had on their carrier fleet for the forthcoming Battle of the Philippine Sea.

Land-based aircraft as back-up for the IJNAF carrier units amounted to no more than about 200 whereas the US air arms could provide over four times as many land-based combat aircraft: US Navy, 258; US Marine Corps, 352; and US Army Air Forces, 269. An unusual example of this support related to 73 USAAF Republic P-47 Thunderbolts—*Profile No. 7*—which were flown-off Escort carriers in June to assist USN aircraft in their operations against the Japanese.

*Backed-up by part of the US 5th Fleet with a further 11 escort carriers available.

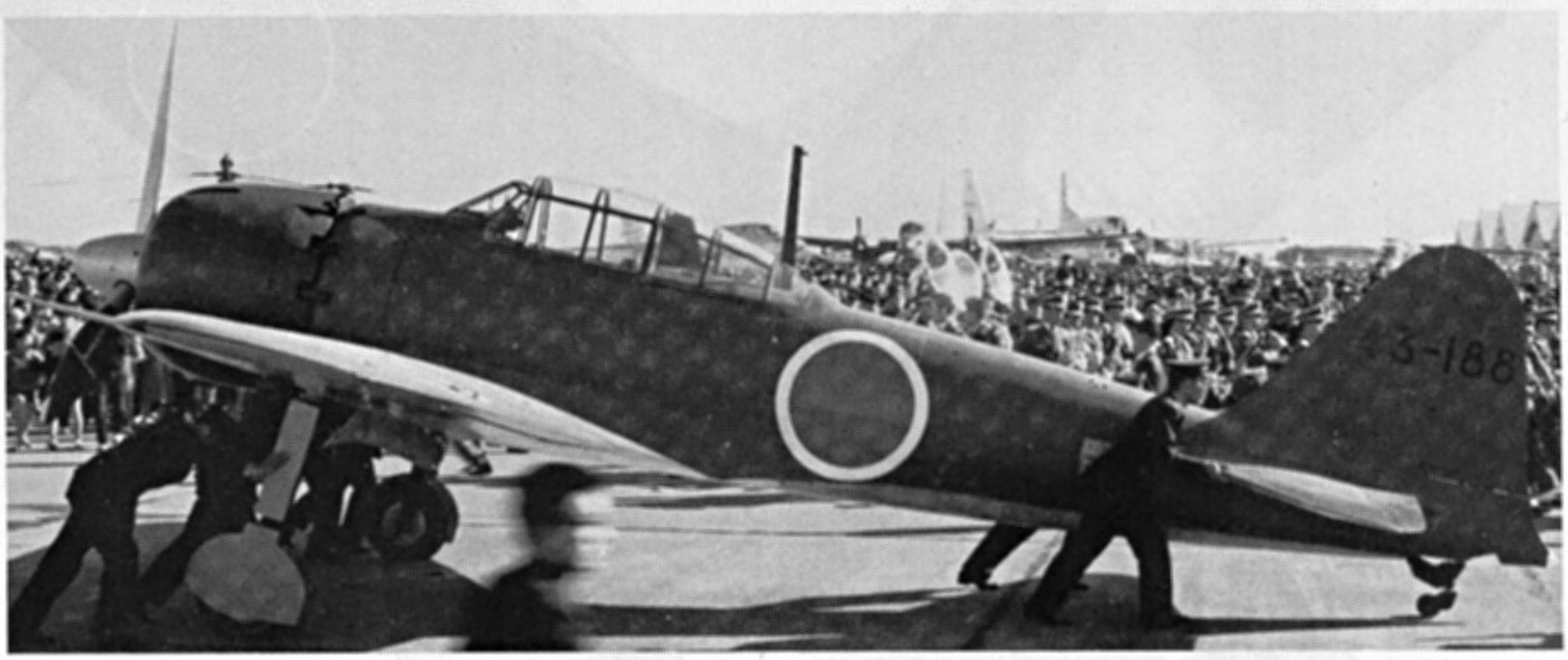
The Philippine Sea Battle

The tactics adopted by Vice-Admiral Ozawa consisted of using to maximum advantage the superior combat radius of his carrier-based fighters and bombers. In this instance, he was able to launch his opening attacks against the US carrier force while his own carriers were still out of range of American counter air strikes.

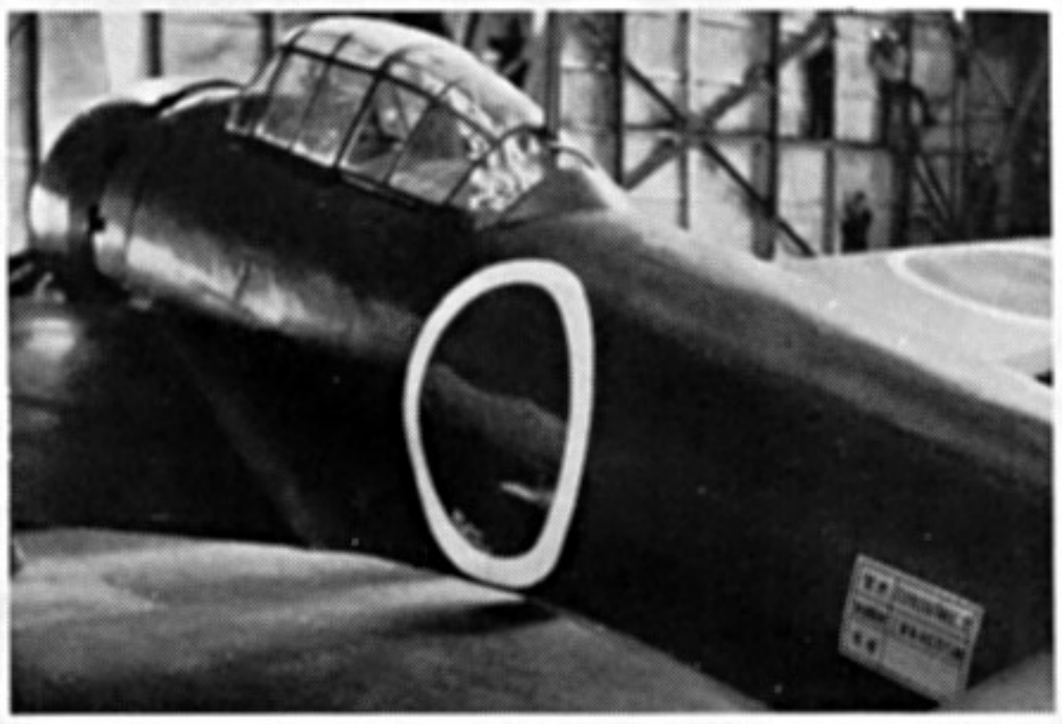
The first IJNAF formations—launched from 07:30 to 12:30 on June 19, 1944 as part of *Operation 'A'*—comprised 109 dive-bombers and 129 torpedo-bombers, escorted by 108 A6M5 *Zero-Sen* fighters. Long before these formations reached their designated target area, this strike force was located by the US Navy defensive patrols. The force was decimated by intercepting Grumman F6F Hellcats and those still unscathed then found it almost impossible to penetrate the heavy screen of anti-aircraft fire surrounding the US carriers. Thus, *Task Force 58* survived the first air strike without a single casualty to the ships involved.

With several hundred nautical miles still separating the fleets, Rear-Admiral Raymond A. Spruance, USN*, concluded that it would be more advantageous to postpone launching any immediate offensive strikes against the Japanese Fleet. Instead the decision was taken to concentrate on heavy defensive patrols by F6F Hellcat fighters, with an inner anti-aircraft screen around his force. The resultant massacre of the Japanese aircraft turned the tide of battle, with some

*Rear-Admiral Spruance was then overall Fleet Commander.

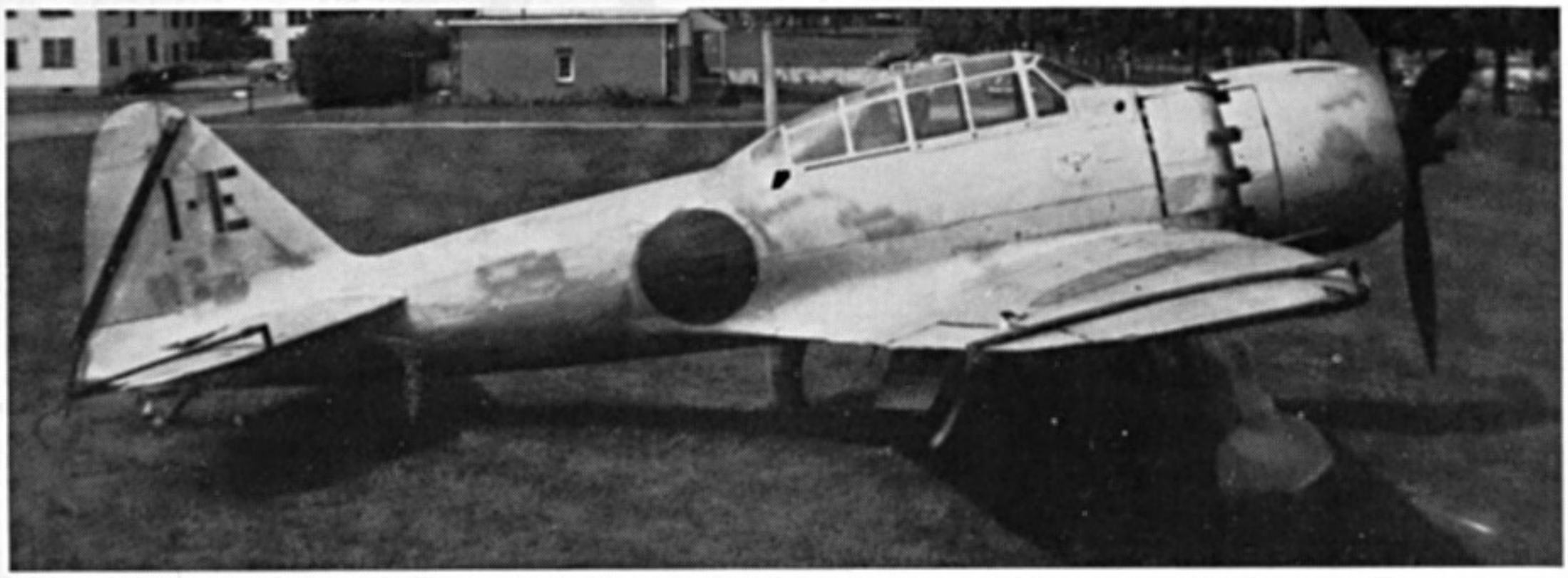


Realization. After two years of meticulous restoration, on November 3, 1964, a 'factory fresh' No. 4,685 was handed over to the JASDF by the Governor of Guam during a ceremony at Iruma Air Base, near Tokyo. Across the fin and rudder is the Model 52's original unit markings of 43-188.
(Photo: Major Robert C. Mikesh)

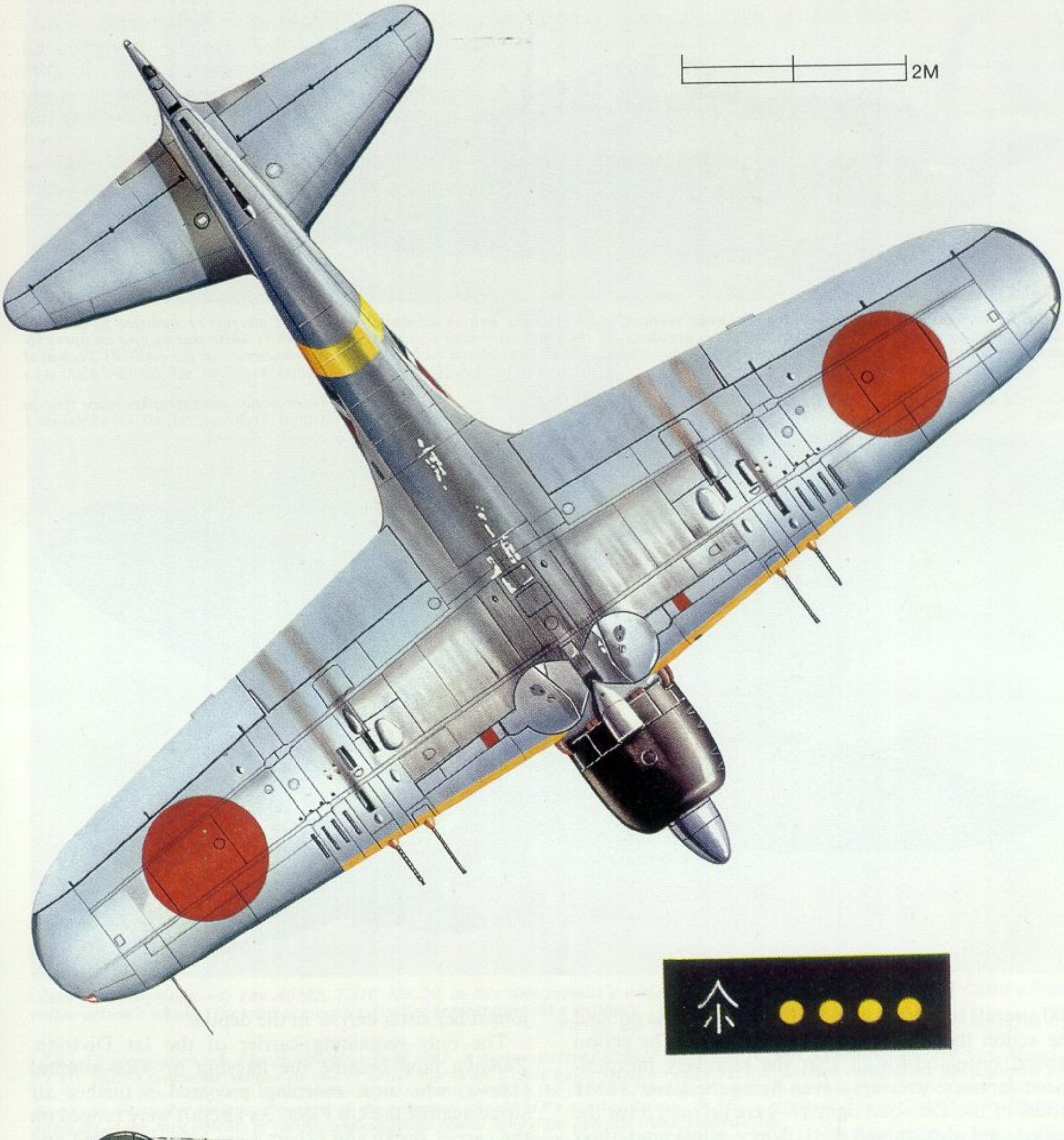


Renovation. The smooth exterior of the refurbished Model 52 is shown to advantage in this close-up. The 'museum'-type identification white panel forward of the tailplane—which confirms No. 4,685 was Mitsubishi-built—may be compared with the correct contemporary-style panel of a Model 52c on page 31.
(Photo: Major Robert C. Mikesh)

NAS retention. Photographed in 1959 at Naval Air Station Willow Grove, Pennsylvania, this Zero-Sen, *Model 52 (A6M5) appears complete less the propeller spinner. An anti-corrosion paint appears to have been applied overall and the tail markings are not of IJNAF origin.* (Photo: *Air-Britain* archives)



A Mitsubishi A6M5c, Navy Type O Carrier Fighter Model 52c ('Zeke' 52c) of the Tsukuba Naval Air Corps, Imperial Japanese Navy Air Force, from the Oita Air Base, Japan, July 1945. This was an advanced training unit employed on home defence duties. The enlarged detail—see fuselage, port side, under canopy indicates four "kills".



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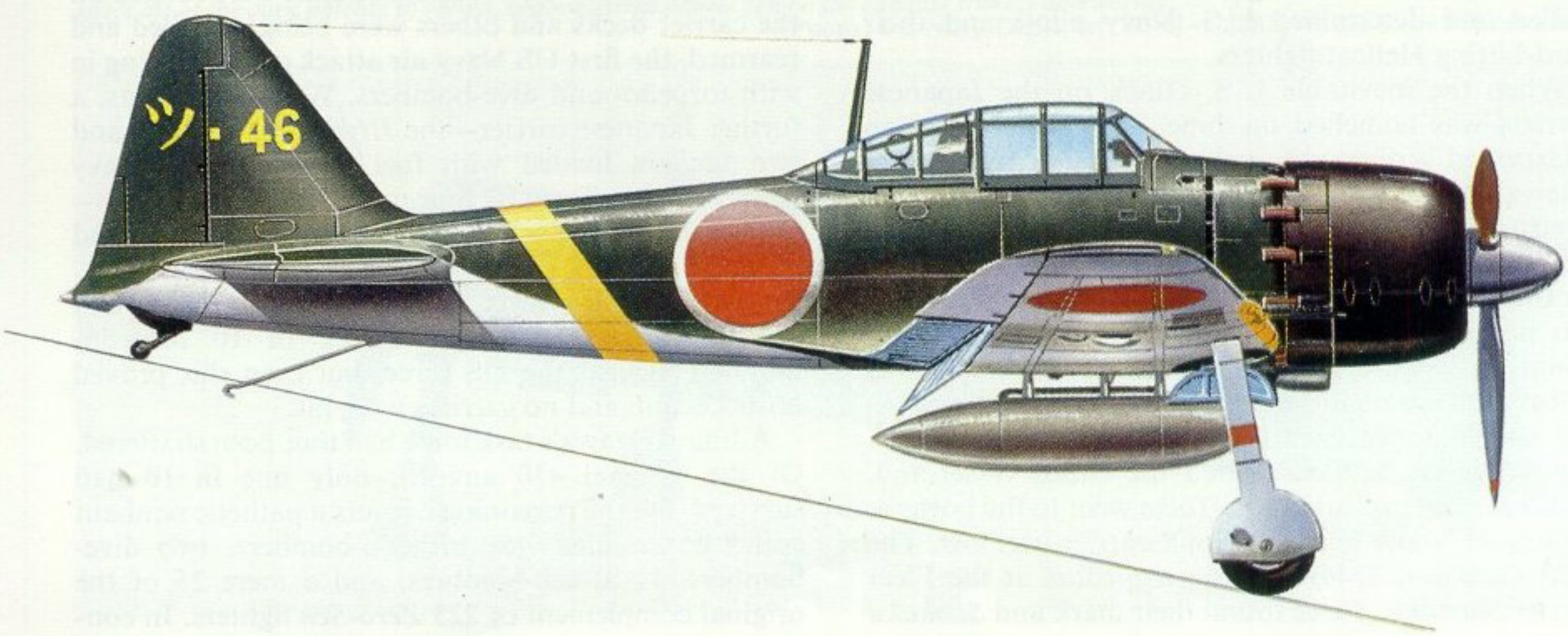
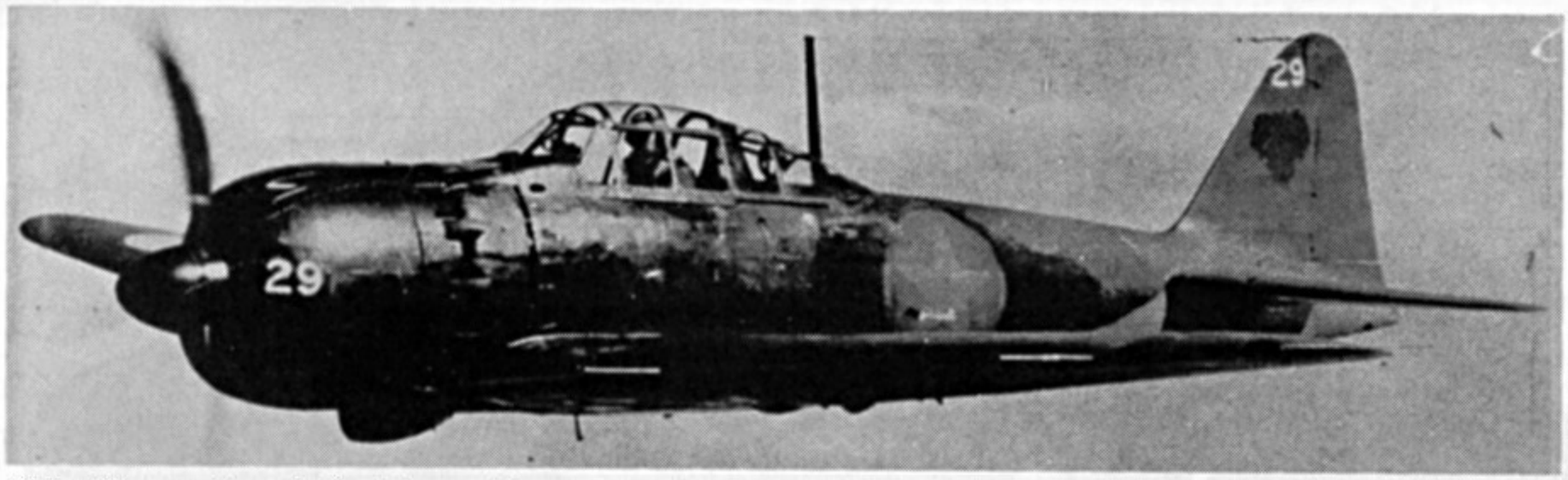




'Zeke 52' recognition—1. The US armed forces eventually adopted the British advanced methods of aircraft recognition by suitably photographing enemy and friendly aircraft. This accounts for the temporary near obliteration of the U.S. white star to give an approximate 'red meatball' Hinomaru. *The number '29' on cowling and fin was allocated by the U.S. headquarters of the (Allied) Technical Air Intelligence Center or TAIC.*
(Photo: US Navy Dept., National Archives, ref. 80–G–18500 srs.)

'Zeke 52' recognition—2. The Zero-Sen, *Model 52 (A6M5), TAIC No. 29, posed for the aircraft recognition photographer some time in 1944.*
(Photo: US Navy Dept., National Archives, ref. 80–G–18500 srs.)

300 aircraft lost in the first day. The Americans dubbed the action the *"Marianas Turkey Shoot"*. The action proved once-and-for-all that the relatively inexperienced Japanese aviators—even flying the latest A6M5 model of the *Zero-Sen* fighter—were no match for the skilled and determined U.S. Navy pilots and their hard-hitting Hellcat fighters.

When the inevitable U.S. attack on the Japanese carriers was launched on June 19, it came from an unexpected direction—submarines. Vice-Admiral Ozawa's flagship, the Fleet carrier *Taiho,* was accurately struck by six torpedoes launched by USS *Albacore* (SS218). Escaping fuel vapour made it necessary for Ozawa to transfer to the cruiser *Haguro,* but the *Taiho* was not in any immediate danger of sinking. Ninety minutes afterwards, the Captain of the *Taiho* who was still aboard unintentionally turned on the fans throughout the ship. An electric discharge ignited the fuel, vapour which had permeated the entire vessel and, with a mighty explosion, the *Taiho* went to the bottom.

Only 4½ hours later, a second carrier was lost. The USS *Cavalla* (SS244) fired six torpedoes at the Fleet carrier *Shokaku.* Three found their mark and *Shokaku* joined her sister carrier in the depths.

The only remaining carrier of the 1st Division, *Zuikaku* now became the flagship of Vice-Admiral Ozawa, who next morning prepared a further air strike against the US Fleet. As aircraft were ranged on the carrier decks and others were being refuelled and rearmed, the first US Navy air attack came winging in with torpedo- and dive-bombers. Within moments, a further Japanese carrier—the *Hiyo*—was sinking, and two tankers loaded with fuel were ablaze. Heavy damage was suffered by four more Japanese carriers—the flagship *Zuikaku* together with *Chiyoda, Junyo* and *Ryujo.*

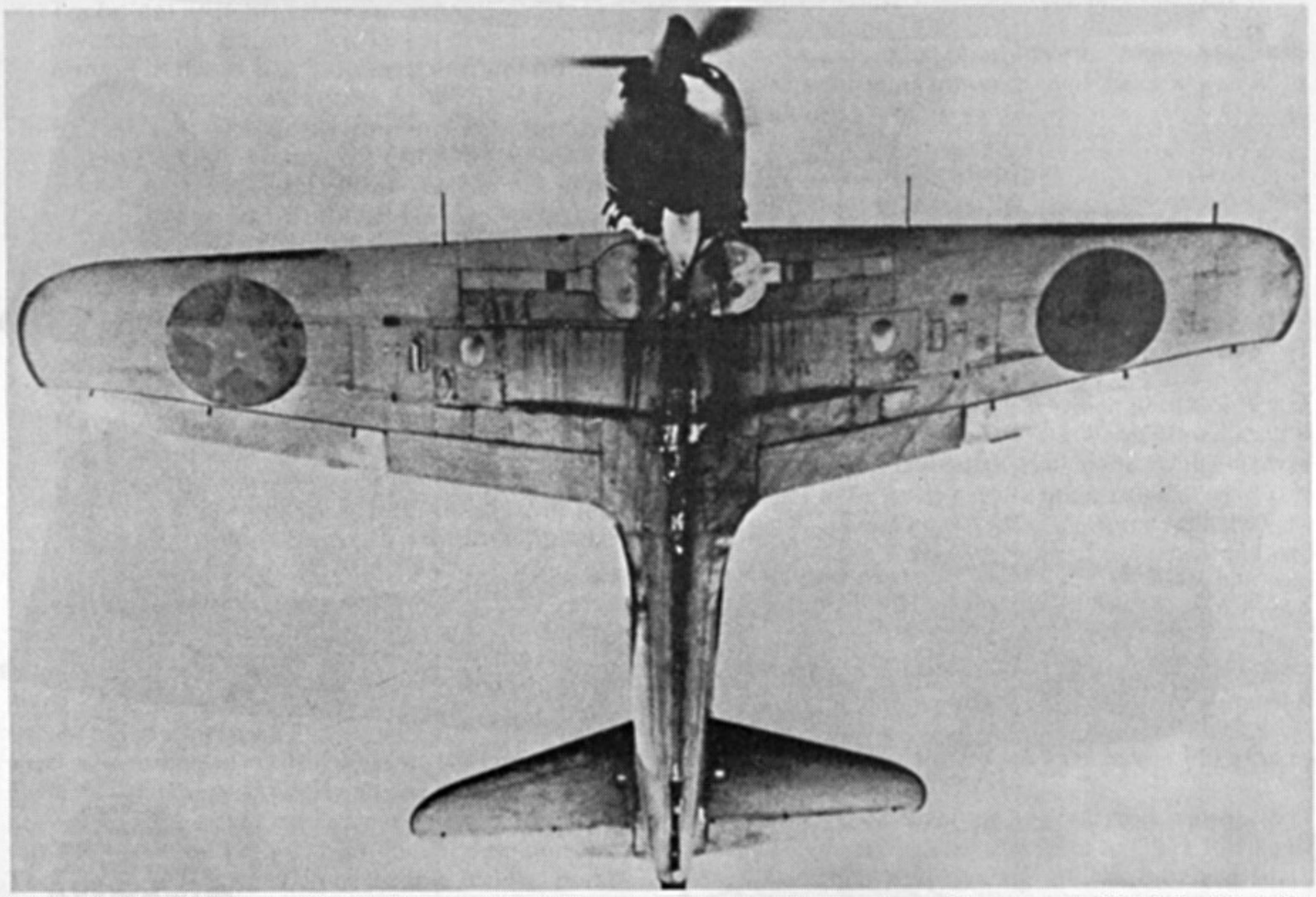
As a last desperate attempt, the surviving IJN carriers launched a night attack of 10 torpedo-bombers against the US force, but even this proved unsuccessful, and no carriers were hit.

Admiral Ozawa's task force had thus been shattered. Of the original 450 aircraft, only one in 10 had survived. On the remaining carriers a pathetic remnant could be counted—six torpedo-bombers, two dive-bombers, 12 attack-bombers, and a mere 25 of the original complement of 225 *Zero-Sen* fighters. In con-

trast, the US forces had lost only 26 aircraft in combat.

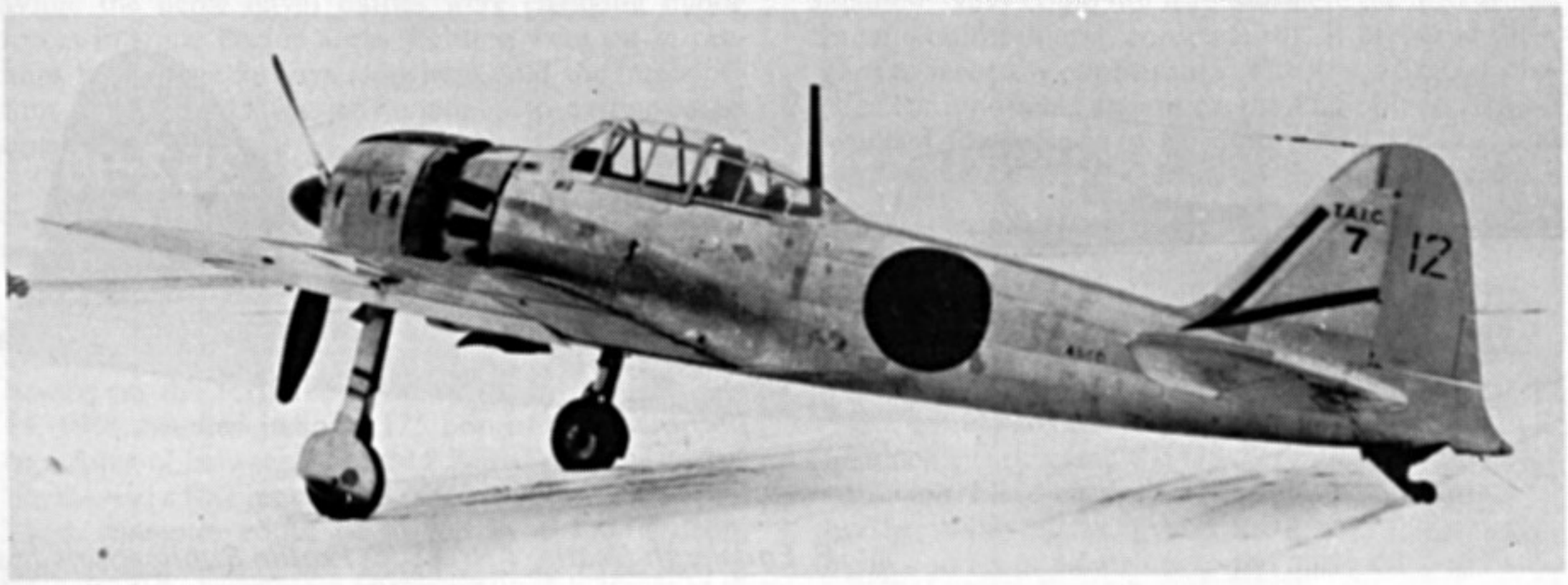
Such devastating losses of fighters—and perhaps more important, of the limited reserves of experienced pilots—prevented the Japanese ever again from mounting an aggressive force on a large scale. Though further mighty naval battles were to take place before the Pacific War came to an end, the Japanese commanders were forced to fight them in the knowledge that their resources were limited and were being fast depleted.

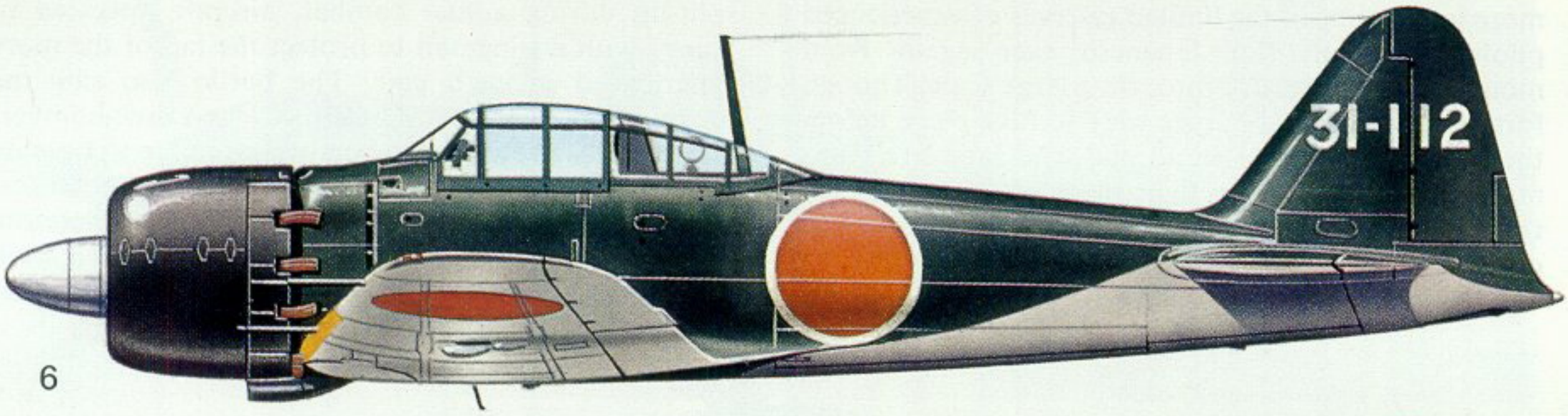
Tactics adopted by the *Zero-Sen* pilots in the Battle of the Philippine Sea included the adoption of 12 aircraft elements, flown in three flights of four. When split-up during actual combat, aircraft operated in pairs—with a wingman to protect the tail of the more experienced of each pair. The battle also saw the introduction of the A6M5 *Zero-Sen* as a dive-bomber. The new D4Y *Suisei* bombers were unable to operate effectively from the decks of the smaller Light carriers, and 63 of the A6Ms of Ozawa's force were therefore modified to carry a 250 kg. (550 lb.) bomb. Navigation to the target was carried out from a 3-seat B6N *Tenzan*



'Zeke 52' recognition—3. The A6M5, TAIC No. 29, in this view permits a useful comparison with artist P. Endsleigh Castle's 5-view colour artwork which is the most accurately detailed presentation yet published.
(Photo: US Navy Dept., National Archives, ref. 80–G–18500 srs.)

'Zeke 52' recognition—4. Photographed early in 1945 on a snow-covered airfield in the U.S.A., this paint-stripped Zero-Sen, *Model 52 (TAIC No. 7) is also the subject of one of artist Endsleigh Castle's side views on page 32. For aircraft recognition photographic purposes, TAIC No. 7 displays both pseudo Japanese unit flash on the tail and fuselage* Hinomaru*—yet the port upper wing retains the American white star insigne. Forward of the tailplane, the A6M5's construction no. 4,340 is retained. The carbon deposit slipstream effect aft of the dark patches of raised, heat-resistant panels behind the exhaust stubs is noteworthy.*
(Photo: US Navy Dept., ref. 80–G–171883, via Dr Rene J. Francillon)





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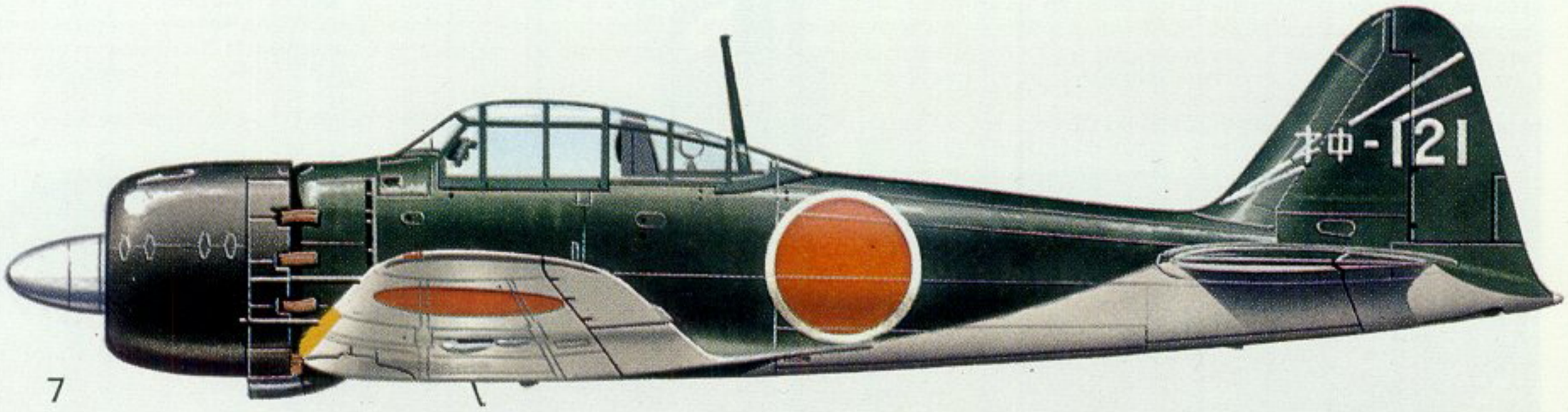

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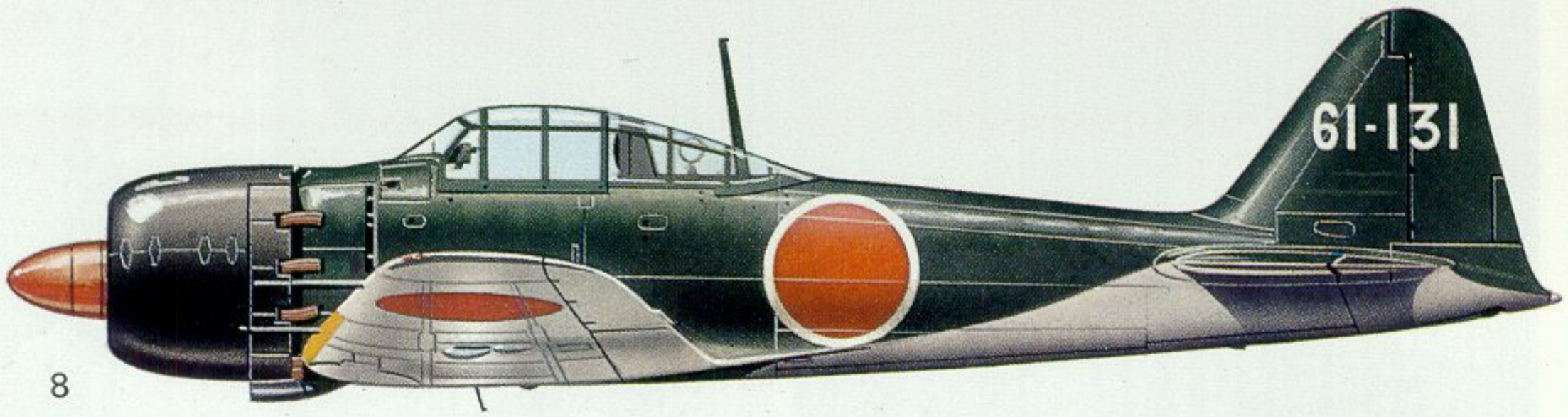

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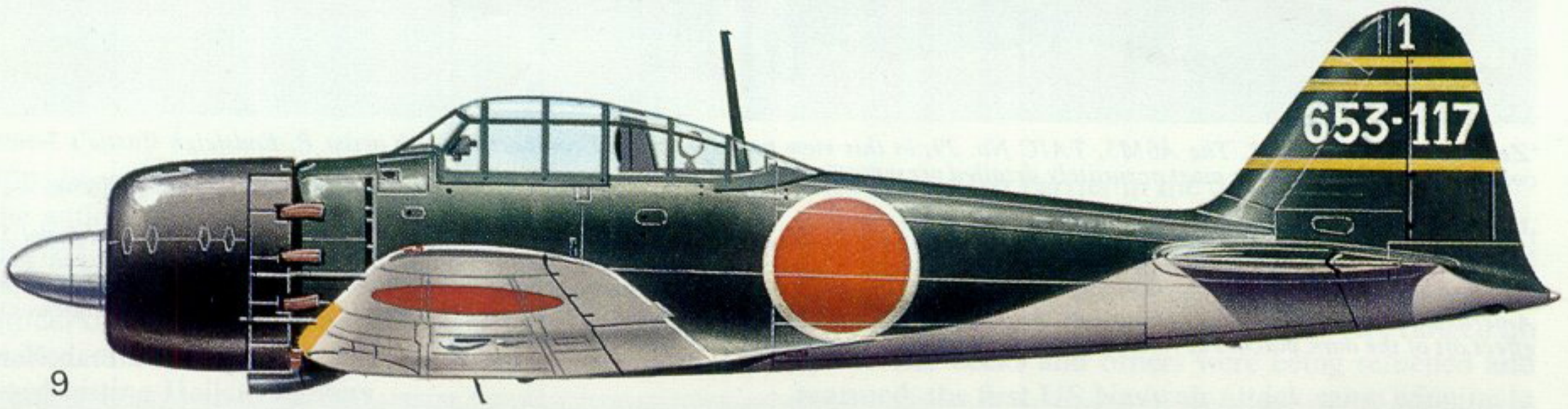

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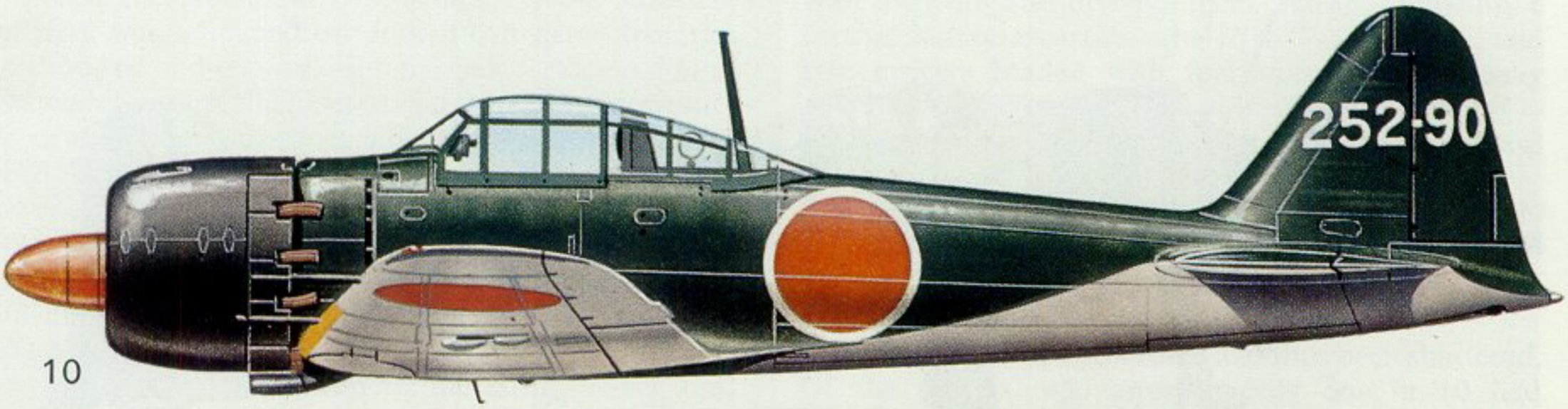

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Key to colour illustrations

6 31-112. A *Zero-Sen,* Model 52 of the 331st Naval Air Corps, Imperial Japanese Navy Air Force, 1944.

7 *Kami*-121. A *Zero-Sen,* Model 52 (A6M5) bearing *Kamikaze* identification in 1945. This unit, the 721st NAC, was based in Japan from October 1944 to the end of the Pacific war in August 1945.

8 61-131. A *Zero-Sen,* Model 52 (A6M5) of the 261st NAC which was captured by a US Technical Air Intelligence team after the invasion of Saipan in 1944. Eventually it arrived in the U.S.A. aboard a carrier and was used for flight evaluation.

9 653-117 1. The upper numeral '1' identifies this *Zero-Sen,* Model 52 (A6M5) as operating from the IJN Fleet carrier *Zuikaku (Operation Sho,* October 1944), while the three yellow bars identify it as being flown by the Commanding Officer (Flying)—in this case, of the 653rd NAC.

10 252-90. A *Zero-Sen,* Model 52c (A6M5c) of the 252nd NAC., No. 316 Fighter Squadron. On May 3, 1945, this A6M5c was flown by Naval Air Pilot, 1st Class Naruo Taguchi on a mission against Boeing B-29 Superfortress bombers. (Sharp eyes will detect that the 13-mm. machine-gun has been unintentionally omitted from its rightful position outboard of the 20-mm. wing cannon.—Editor).

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attack-bomber which led each formation. But after flying some 350 nautical miles to reach the US fleet, the *Zero-Sen* pilots were in a semi-exhausted state, and were quite unable to evade the fierce attacks of the F6F Hellcats—the more so while still encumbered with the heavy bomb-load they carried. Despite their failure in this operation the way was open to new developments. The ability of the A6M to carry this 250-kg. bomb-load, and its greater accuracy in bombing—for a pilot with limited experience—than that achieved with more conventional dive-bombers was to sow a seed in the minds of certain naval aviators that would later revolutionize conventional air attacks.

In Other Fields

While the fierce naval battles were engaging major forces in some Pacific areas, fighting went on in perhaps less dramatic ways elsewhere, and the introduction of the A6M5 was not confined to carrier-based operations.

One unusual experiment encountered by the Allies occurred in the Carolines. US 13th Air Force Consolidated B-24 Liberator bombers *(Profile No. 19),* attacking Truk and Yap during June 1944, reported that their formations met 'Zeke' fighters which attempted initial attacks by dropping phosphorous bombs on the formation. One such attack, on July 15, 1944, resulted in some 125 bombs being dropped by a force of between 12 and 15 *Zero-Sens.* The earlier bombs had a fuse requiring 3,000 feet to arm the bomb. Later examples could be armed in a 300-ft. drop, representing only three seconds' delay. The diving attack approach came out of the sun, with the fighters coming in firing all guns some 3,000 feet above the bombers. They then pulled out to release the bombs in level flight, using the O.P.L. optical sight to establish the proper range—a B-24 would fill the inner ring of this sight at 3,000 feet—release the bombs above and ahead of the formation, slow roll, and break away beneath for further conventional attacks. The B-24s were then obliged to fly on into the descending swarm of phosphorous bombs which would ignite if they struck an aircraft. The size and tightness of the B-24 defensive formations made evasive action in such circumstances almost impossible.

As a weapon, the phosphorous bomb remained largely experimental however, and success was of a limited nature.

The Philippine Campaign

After the initial shock of the loss of the carriers, the 1st Air Fleet of the IJNAF was assisted by the moving up of the 2nd Air Fleet to the battle area. The 202nd Air Group of the latter was equipped with the A6M5 *Zero-Sen* as well as the new Kawanishi N1K1 *Shiden* ('George')—*Profile No. 213*—just coming into combat service. Defensive strength of land-based Philippine aircraft was boosted to 750 (of which about only 500 were operational). As the US task forces closed in, the A6Ms were transferred to Cebu island in the central Philippines to be ready for use in that area.

On September 11, 1944, the US force launched an all-out attack on Cebu. Warning of the attack did not reach the Japanese base, through a misunderstanding, and on arrival over the airfield, the US aircraft found no fewer than 100 *Zero-Sen* fighters all neatly lined-up on the runway. In subsequent strafing runs, over 50 were totally destroyed and the rest seriously damaged. Thus, in no time at all a major part of the serviceable Japanese front-line fighter strength in the Philippines was rendered useless.

The IJNAF brought up urgent replacements and transferred the main *Zero-Sen* force to Clark Field and Manilla. Further US strafing attacks on these bases resulted in the loss of many more fighters on September 21 and 22.

The Battle of Leyte Gulf

While the land battles continued, the stage was being set for what was to prove the greatest naval engagement of all time—the Battle of Leyte Gulf. The Imperial Japanese Navy could not foretell where the next Allied thrust would fall and, consequently, it prepared three plans to meet any contingency. The first—*SHO-1* provided for a possible assault on the Philippines, *SHO-2* provided for defence of Formosa and Okinawa, and *SHO-3* related to the defence of the home islands of Japan.

The Allies were not in full agreement on this vital issue, and only after President Roosevelt had travelled to Hawaii—in July 1944—and conferred with General MacArthur and Admiral Nimitz, was the decision reached to continue the island-hopping campaign to Palau, Mindanao and Leyte.

To achieve this aim, the US *Task Force 38* equipped with nine Fleet carriers and eight Light carriers—together with battleships, cruisers and destroyers—began a series of air strikes to the north on October 6,

1944. Contact between the opposing battle fleets was established. On October 11, following misleading reports of successful attacks on US carriers from returning Mitsubishi G4M2 ('Betty')—*Profile No. 210*—torpedo-bomber crews, Admiral Toyoda committed the whole of Vice-Admiral Ozawa's carrier force to fly to Formosa to join the battle. Four days later, on October 15, 419 sorties were launched in three waves, but with little success, many completely failing to locate the vast American invasion fleet only a few miles offshore.

US Navy aircraft maintained a continuous series of strikes against Formosa for a three-day period, during which some 550 Japanese aircraft were shot down—and almost all carrier group aircraft lost—against US losses of 89 aircraft.

On the other hand, the optimistic battle reports filed by the now many inexperienced Japanese aircrews gave a totally misleading impression to Admiral Toyoda of the true situation which was to influence his actions in the following days. These exaggerated battle reports also led to an official Japanese announcement being issued that, to date, 11 US Navy carriers had been sunk. At this time, in fact all these carriers were intact and little damaged.

A good example of the ascendancy of US Navy fighters over the IJN *Zero-Sens* occurred on October 24, 1944. Commander David McCampbell, USN, was in charge of a flight of seven F6F Hellcats escorting a strike from the Fleet carrier, USS *Essex* (CV9). Some 30 naut. miles out, they intercepted a force of 30 Japanese bombers with a similar number of fighter-cover A6M5s flying above them at 14,000 feet. Commander McCampbell directed five of his flight to attack the bombers, while he and his wingman alone took on the 30 'Zekes'. The bombers lost nine of their number to the Hellcats while the A6M5s fared even worse. McCampbell and his wingman between them destroyed no fewer than seven before the remaining 'Zekes' adopted one of the standard—and oldest—defensive tactics by forming a ring. While this measure may have been effective with ample fuel reserves, the *Essex* Hellcat pilots were well aware that in this instance they held the upper hand regarding endurance. All they had to do was wait for short-of-fuel stragglers to break in succession and head for home. By this means they downed a further seven 'Zeros', bringing their total to 14. This one engagement typifies the defensive nature of the actions which increasing desperation was forcing upon the IJNAF; particularly with their reserves of trained aircrews almost exhausted.

October 25, 1944—A Date for History

In retrospect, October 25, 1944 was the occasion of the destruction of more carriers than those lost on any single day, before or since. Also, this day saw the first successful operations of the *Kamikaze* (Divine Wind) suicide aircraft. Initially, the tide of success ran with the Japanese.

The US *Task Force 77.4*—under Rear-Admiral Sprague, with 16 Escort carriers—had engaged the enemy, but the Escort carrier USS *Gambier Bay* (CVE73) had come under fire from the heavy guns of the cruiser IJN *Chikuma* and, after being set on fire, she capsized and sank. This was the second carrier lost to *Task Force 77.4;* on the previous day, the Light carrier USS *Princeton* (CVL23) had been hit by bombs from a lone D4Y1 *Suisei* ('Judy') bomber. Thus, after being abandoned on fire, the *Princeton* had to be sunk by US Navy torpedoes. The air elements of the opposing Japanese Fleet comprised the Fleet carrier *Zuikaku* and the three Light carriers *Chitose, Chiyoda* and *Zuiho*. These vessels now came under US Navy air attack. As an indication of the depleted state of the IJNAF, even the giant *Zuikaku* (25,675 tons) had but 29 aircraft (19 of these being *Zero-Sens)* on board—this *Shokaku*-class carrier being capable of housing 84 aircraft.

As the US strike aircraft attacked, they were met by the 'Zeke' fighters, for the most part flown by novice pilots. More than half the IJNAF defending force was shot down, while others made for Luzon shore bases as their ammunition ran out, leaving no effective air opposition to challenge the Americans. The Light carrier *Chitose* was brought to a standstill by Curtiss SB2C Helldiver bombers—*Profile No. 124*—while the *Zuiho* and *Zuikaku* were both hit by torpedoes from Grumman TBF Avenger attack-bombers—*Profile No. 214*. An attempt was made to take the *Chitose* in tow but at 09:37 she sank.

A second US air strike of 36 aircraft was launched and this time the *Chiyoda* was set ablaze by bombs. This was followed by the third and largest strike force of 200 aircraft. The Fleet carrier *Zuikaku* was hit by bombs and set ablaze. Three air-launched torpedoes sealed her fate and, at 14:14, she sank. At the same time also, the *Zuiho* was set ablaze by bombs.

A fourth but smaller strike ensured the end of the *Zuiho* which went to the bottom at 15:26. The Japanese tried desperately to take the last carrier of their task force—the crippled *Chiyoda*—in tow, but US cruisers directed to the scene found her stationary; and an easy target for their 6-inch and 8-inch guns. At 16:55, IJN *Chiyoda* sank following the bombardment, thus securing the death-knell of the entire Japanese carrier force.

Kamikaze (Divine Wind)

The idea, born of desperation, to use a force of *Zero-Sen* fighters, each equipped with a 250-kg. (550-lb.) bomb for one-way suicide missions was put forward as the only possible means of salvation for the battered remnants of the Japanese Navy forces. The intention was to limit strictly the force to volunteers from the inexperienced pilots who by now had insufficient time to be trained in the tactics of air-fighting or accurate dive-bombing, and who would only have to be able to control the aircraft in a single final death dive. The few experienced pilots remaining with the squadrons could not be expended in this manner, and their role was to be limited to navigating the novices to the point of attack and acting as escorts to engage defensive enemy fighters.

The name *Kamikaze** was chosen to commemorate the providential "Divine Wind" which twice scattered the Kyushu-invading fleet of Kublai Khan, the Mongol emperor in 1281 AD.

The plan was first presented to the aviators of the 201st Naval Air Group at Clark Field in Luzon on October 19, 1944. The first successful mission took place

*The IJNAF groups involved adopted the title *Kamikaze Tokubetsu Kogekitai* or Divine Wind Special Attack Squad.

'Zeke 52'—ATAIU SEA. Compared with the immaculate Zero-Sen, *Model 52 on page 48, this British-flown A6M5 is distinctly weathered. The Allied Technical Air Intelligence Unit, South East Asia was a British and Commonwealth unit operated in conjunction with the U.S.-created Technical Air Intelligence Center. On the tail is the local ATAIU marking of B1-05. Photographed over Malaya in 1945.* (Photo: Imperial War Museum, ref. CF 899)

on October 25, 1944, led by Lieutenant Yukio Seki. The previous two individual missions on October 21 and 23 failed to locate the US Navy carriers.

The *Kamikaze* aircraft were obsolete A6M2 *Zero-Sens,* escorted by newer A6M5s. First to be hit was the Escort carrier USS *Santee* (CVE29)—the 'Zeke' exploding below the hangar deck and starting a fire. By coincidence, CVE29 was struck almost simultaneously by a torpedo from the Japanese submarine *I-56* but, though badly damaged, *Santee* survived both attacks. At virtually the same time, another *Zero-Sen* exploded in the ship's hangar of the Escort carrier USS *Suwannee* (CVE27). Two more dived separately on USS *Sangamon* (CVE26) and USS *Petrof Bay* (CVE80), but were hit by AA fire and missed their targets.

Three hours later, a second onslaught was launched. The first *Zero-Sen* missed the bridge of USS *Kitkun Bay* (CVE71) and bounced in the sea as its bomb exploded on the flight deck effecting severe damage. Two more narrowly missed USS *Fanshaw Bay* (CVE70) and another hit the water beside USS *White Plains* (CVE66), showering the flight deck with debris as it exploded. The fifth member of this *Kamikaze* group dived towards CVE66 but swerved away to the Escort carrier USS *Saint Lo* (CVE63). Plunging through the flight deck, the *Kamikaze* started off a series of explosions which blew the ship in two and sank her.

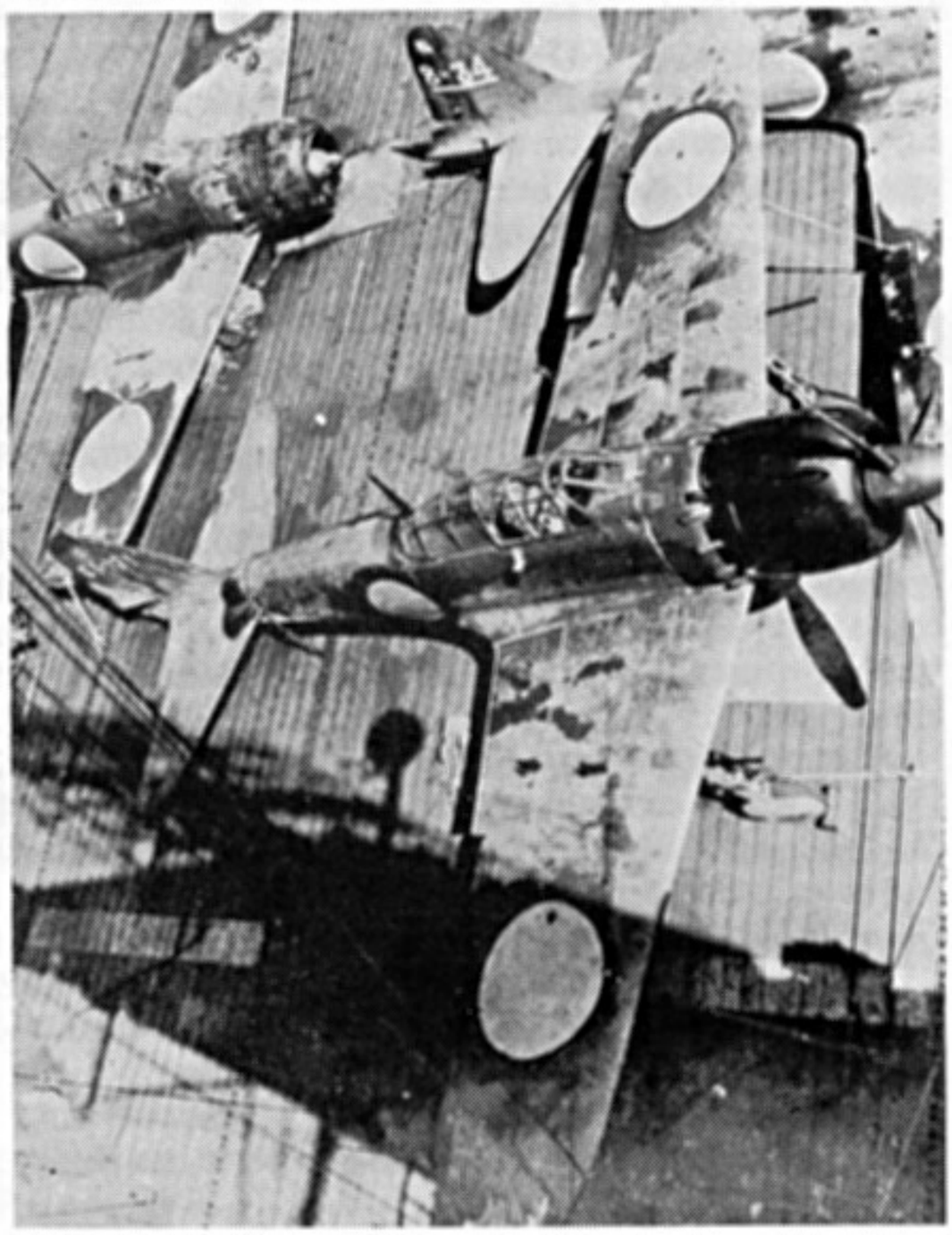
A further 'Zeke' suicide attack took place the following day. The three *Kamikazes* with their two A6M5 escorts were fortunate as they arrived while the US Fleet was beating-off a raid by 12 D4Y *Suisei* ('Judy') bombers, thus enabling them to penetrate the defensive screen. The first two *Zero-Sens* narrowly missed both USS *Sangamon* and USS *Petrof Bay*. The third crashed squarely on a TBF Avenger positioned on the forward elevator or lift of the carrier USS *Suwannee,* setting fire to the other aircraft standing on the flight deck. More than 150 of CVE27's complement was killed, but the carrier survived to fight again.

The tactics used by *Zero-Sens* on *Kamikaze* attacks settled into a definite pattern after the initial inexperienced attempts. Part of the later *Kamikaze* force acted as decoys to draw AA fire by flying high and manoeuvring at the edge of the 40-mm. gun range, while operating simultaneously at different compass points. When the AA fire thus was being drawn, the bomb-laden suicide 'Zekes' would come in straight, in pairs, in a minimum height dash to their target. Favourite aiming-point on the carriers was the forward elevator from which point most damage could be done.

The last *Kamikaze* attacks of the Philippines area took place on January 25, 1945, but could not prevent the US forces from landing on Luzon. Analysis of the suicide attacks in the Philippines shows that 74% of the aircraft leaving bases (including escorts) were *Zero-Sens,* while 79% of the aircraft completing suicide dives were also *Zero-Sens.*

In 10 months of use, suicide aircraft accounted for nearly 50% of all US warships damaged. Their effect on morale may be gauged by the fact that the US Navy was forced to increase their fighter numbers from 54 to 73 per carrier to combat suicide tactics—with a

Several Zero-Sen, *Model 52s appropriated by U.S. TAIC teams after the fall of Saipan, in the Marianas, in June 1944, were then shipped to the USA aboard a US Navy Escort carrier. The IJNAF 261st Naval Air Corps had been in action during the invasion of Saipan.* (Photo: *Koku Fan*)



resultant reduction in the number of attack-bombers carried. Nevertheless, they never achieved the dramatic results which the Japanese High Command hoped for, largely because of the outstandingly aggressive nature of the US Navy F6F Hellcat fighter screen, and the wall of AA fire which the fleet was able to put up.

THE END OF THE LINE

On February 19, 1945, the first US landings took place on Iwo Jima, to be followed on April 1, 1945 by those on Okinawa. The capture of Iwo Jima cost the Allies 5,200 men dead or missing, but for the Japanese, the loss was 22,300 men dead. Its strategic importance became apparent when, from March 4, 1945, it became an emergency landing ground for Boeing B-29 Superfortresses unable to return safely to their bases in Guam or Saipan. By the war's end, no fewer than 2,251 Superfortresses had made emergency landings on Iwo Jima.

Okinawa saw *Kamikaze* attacks on an unparalleled scale. Some 1,800 aircraft were committed to attacks, of which 930 were expended, the rest returning through several causes including inability to locate individual targets. More losses were suffered by the US Fleet in a single battle than on any other occasion. Nevertheless, the attacks did no more than delay the inevitable conclusion. The emphasis had now shifted from the *Zero-Sen* fighters, and virtually all types of Japanese aircraft were readied for *Kamikaze* action.

Production of the A6M5 *Zero-Sen* had dropped substantially since a severe earthquake, on December 7, 1944, which had struck Nagoya, seriously damaging the Mitsubishi plant. After B-29 Superfortress attacks later that month, an emergency dispersal programme was put into operation. However, further production delays followed B-29 damage to the Tokyo factories of Nakajima—manufacturing the Sakae 31 motors—so that aero-engine production fell rapidly behind that of the later-variant airframes.

In the event, A6M5 *Zero-Sens* remained in service until the end of the Pacific War to supplement other fighters in the defence of the home islands—initially against the B-29s and, later, against the carrier aircraft ranging from their offshore bases.

The US Army Air Forces reported that, in February 1945, in a representative mission by 117 B-29s with Nagoya, Japan's third largest city as the target, nearly one-fifth of all the interceptions were made by A6M5s. For the *Zero-Sen* and other defending Japanese fighters, the most acceptable interception tactic was the head-on manoeuvre, the primary aim being to 'pick-off' the leading B-29. The 'leadship' invariably contained the bomb group's most experienced bombardment crew acting as the pathfinder to the target aiming-point.

The mushroom cloud over Hiroshima on August 6, 1945, gave rise to the final grounding of the last *Zero-Sen* and other Japanese combat aircraft in just a matter of nine days later. Its combat service began in China in 1940 and, from Pearl Harbor in 1941 to the last desperate defence of the Japanese home islands in 1945, the *Zero-Sen* was seldom far from the heat of battle. For the Mitsubishi A6M *Zero-Sen*—as 'Reisen', 'Zero-Sen', 'Zero' or 'Zeke'—this outstanding IJNAF fighter had earned a lasting place in military aviation history.

A6M5 ZERO-SEN UNIT HISTORIES

The following units of the Imperial Japanese Navy Air Force are identified as having operated *Zero-Sen* Model 52s (or later variants) from Fleet and Light carriers and/or land bases.

Shipboard units

Three IJNAF *Kokutai* or Naval Air Corps formations are known to be associated with carrier operations.

601st Naval Air Corps. (A mixed aircraft unit). Formed on February 15, 1944, at the Atsugi Air Base, Honshu, this NAC was allocated for service with the IJN Fleet carriers *Shokaku, Taiho* and *Zuikaku* which comprised the 1st Carrier Division.

The 1st Carrier Division took part in the Battle of the Philippine Sea in which both the *Shokaku* and *Taiho* were sunk on June 19, 1944 by US Navy submarines.

This Philippine Sea action was designated by the IJN as *Operation "A"*. On board the three carriers, the 601st NAC supplied the following aircraft: 81 *Zero-Sen* Model 52s; 54 Nakajima B6N *Tenzan* (Heavenly Mountain; Allied code: 'Jill') Carrier attack-bombers; and 90 Yokosuka D4Y *Suisei* (Comet; 'Judy') Carrier bombers of which nine were Model 11 reconnaissance-bombers and the remainder were Model 22 bombers.

Following this sea battle, the 601st became land-based but was—for a short time only—allocated to the Light carriers *Amagi* and *Ryuho*. During the Fall, or autumn, of 1944, the unit saw brief service in the defence of the Philippines.

On February 11, 1945, the 601st NAC was stationed at the Kisaruzu Air Base, near Tokyo, as part of the 3rd Air Flotilla. The unit was still based at Kisaruzu when the Pacific War ended in August 1945.

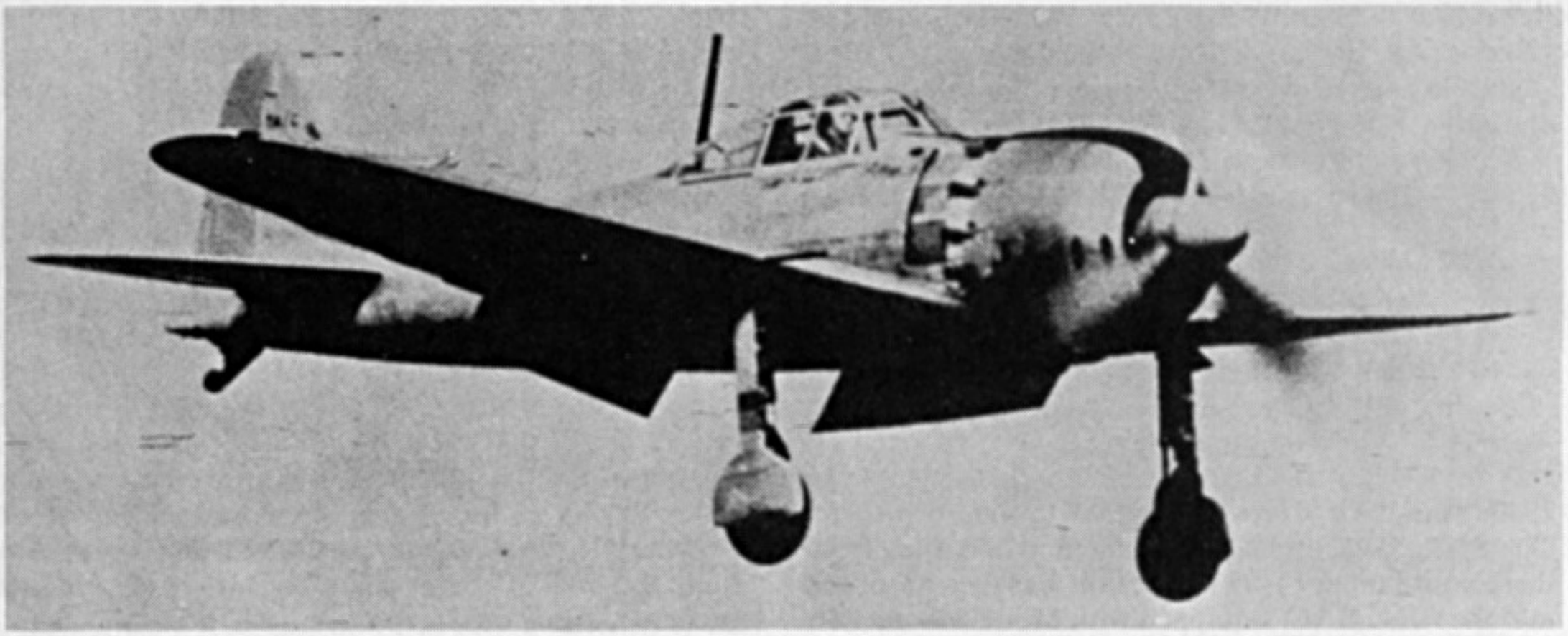
652nd Naval Air Corps. (A mixed aircraft unit). Formed on March 10, 1944, at the Omura Air Base, Kyushu, for service with the 2nd Carrier Division comprising the Fleet carriers *Hiyo* and *Junyo* and the Light carrier *Ryuho* at the time of the Battle of the Philippine Sea in June 1944.

On board the IJN carriers were 81 *Zero-Sen* Model 52s (54 as fighters and remaining 27 as fighter-bombers); 27 Aichi D3A2 ('Val') Carrier bombers; 27 *Tenzan* ('Jill') Carrier attack-bombers; and nine *Suisei* ('Judy') Carrier bombers of the Model 22 variant. The Fleet carrier *Hiyo* was sunk subsequently by US Navy carrier-based aircraft.

The 652nd NAC was disbanded on July 10, 1944.

653rd Naval Air Corps. (A mixed aircraft unit). Formed on February 15, 1944, at the Iwakuni Air Base, Honshu, this unit was destined for service aboard the Light carriers *Chitose, Chiyoda* and *Zuiho* which comprised the 3rd Carrier Division in the Battle of the Philippine Sea. Combat aircraft included: 63 Model 52s (of which 36 were fighter-bombers and the remainder fighters); 12 Nakajima B5N2 ('Kate') Carrier attack-bombers; and six *Tenzan* ('Jill') Carrier attack-bombers.

After the Philippine Sea engagement, the unit was reformed at the Ohita Air Base before embarking on IJN carriers to take part in the Battle of Leyte Gulf (named *Operation Sho* by the Japanese) on October 25, 1944. The 653rd absorbed some elements of the 601st NAC and a few aircraft still retained the 601st's unit



A rarely illustrated aspect of the Zero-Sen, *Model 52—with undercarriage and flaps 'down'. This bare-metal A6M5 has the marking TAIC on the fin but the individual number is hidden by the starboard wingtip.* (Photo: *Koku Fan*)

With the heavier wing armament visible—a 20-mm cannon and outboard 13-mm heavy machine-gun, this 'Zeke 52' variant can be identified as a Zero-Sen, *Model 52c (A6M5c). The tail markings include the prefix 252 and identify it as belonging to the 252nd Naval Air Corps (and allocated to No. 304 Fighter Squadron) in early 1945.*
(Photo: Masami Otomo via Yasuho Izawa)

markings at the time of the Leyte Gulf battle.

During the Battle of Leyte Gulf, aircraft of the 653rd NAC were dispersed to the carriers—including the Fleet carrier *Zuikaku*—in the following quantities:

Light carrier *Chitose*—A dozen *Zero-Sen* 52s (including four fighter-bombers) and four *Tenzan* ('Jill') attack-bombers.

Light carrier *Chiyoda*—Complement as *Chitose*.

Light carrier *Zuiho*—Complement as *Chitose*.

Fleet Carrier *Zuikaku*—Forty *Zero-Sen* 52s (including 16 fighter-bombers), 12 *Tenzan* ('Jill') and eight *Suisei* ('Judy') bombers.

In the event, all the carriers were sunk by US Navy carrier borne aircraft. Most of the IJNAF combat aircraft were flown-off their respective carriers for an attack on the US Fleet. However, because of lack of operational training, all the attack aircraft had to be diverted to land bases in the Philippines. On November 15, 1944 the 653rd NAC was disbanded.

Land-based units

Twenty-two IJNAF land-based *Kokutai* are known to have existed. For convenience, these Naval Air Corps are listed by numerical progression from the 131st to the 721st, followed by the four place-name NACs.

131st Naval Air Corps. (A mixed aircraft unit). Formed on July 10, 1944, at Matsuyama Air Base, on Shikoku. Attached to the 3rd Air Flotilla and based at Matsuyama until the close of the Pacific War in August 1945, using the *Zero-Sen* Model 52.

201st Naval Air Corps. (A fighter unit). Formed on December 1, 1942, the 201st NAC saw service in the south-west Pacific area. In 1944, the unit was based at Truk and partially re-equipped with *Zero-Sen* 52s. By July 10, 1944, the 201st had moved to the Philippines and took part in the first *Kamikaze* (Divine Wind) suicide operations in October of the same year—using obsolescent Model 22s escorted by Model 52s.

The 201st NAC was disbanded on January 9, 1945 and, a month later, subsequently reformed in Japan on February 5, when it was attached to the 26th Air Flotilla of the 1st Air Fleet.

202nd Naval Air Corps. (Principally a fighter unit). Formed on November 1, 1944, from the 3rd NAC and based on the islands in the mid-Pacific area, including Saipan, Ponape, Truk, Palau and the Netherlands East Indies. Some elements of this NAC re-equipped with *Zero-Sen* 52s in 1944. The 202nd disbanded on July 10, 1944, when attached to the 22nd Air Flotilla, 1st Air Fleet.

203rd Naval Air Corps. (A mixed fighter unit). Formed on February 20, 1944, at the Atsugi Air Base, Honshu. Based for a short time in the Philippines in late 1944 and moved back to Japan early in 1945. It was stationed at the Tsuiki Air Base and attached to the 72nd Air Flotilla, 5th Air Fleet, until the end of the Pacific War, using *Zero-Sen* 52s.

205th Naval Air Corps. (A fighter unit). Formed on February 5, 1945, in Formosa and saw service in Formosa and in the Ryukyu Retto group of islands until the end of the Pacific War when it was attached to the 24th Air Flotilla, 1st Air Fleet. This was the last *Zero-Sen* 52 fighter unit to be formed.

221st Naval Air Corps. (A fighter unit). Formed on January 15, 1944, on Shikoku Island, the unit saw service in Japan, Formosa and the Philippines. It was attached to the 26th Air Flotilla on May 8, 1945 when based in Japan. The fighter squadrons (known as *Sento-Hikotai*) into which this NAC was divided included 308, 312, 313 and 407. The unit was still in existence at the end of the Pacific War.

252nd Naval Air Corps. (A fighter unit). Formed on September 20, 1942, from the previous 252nd NAC. Reformed at the Tateyama Air Base and stationed

there until the end of the Pacific War. Also based at Misawa Air Base, northern Honshu, in early 1944. Mainly equipped with *Zero-Sen* 52s during late 1944 and early 1945. Divided into separate fighter squadrons —*Sento-Hikotai*—those identified included 308, 311, 313 and 316. Attached to the 71st Air Flotilla at the end of the Pacific War.

253rd Naval Air Corps. (A mixed reconnaissance and fighter unit). Formed on November 1, 1942. It was based at Truk on February 19, 1944, and equipped with *Zero-Sen* 52s when the US Carrier Task Force raided the Atoll. The unit was attached to the 22nd Air Flotilla, 1st Air Fleet when it was disbanded on July 10, 1944.

254th Naval Air Corps. (A fighter unit). Formed on October 1, 1943, on Hainan Island and operating from there until January 1, 1945, the unit was then absorbed into the 901st NAC. Equipped with Model 52s in 1944.

261st Naval Air Corps. (A fighter unit). Formed on June 1, 1943, the 261st was based in the Marianas in June 1944 when the US forces attacked. The unit had re-equipped with *Zero-Sen* 52s at the time. A small number of the unit's aircraft was captured and subsequently evaluated by the US Navy. The unit was disbanded on July 10, 1944, while attached to the 61st Air Flotilla, 1st Air Fleet.

263rd Naval Air Corps. (A fighter unit). Formed on October 1, 1943, this unit moved to the Marianas on February 24, 1944. On July 10, 1944, it was disbanded while attached to the 61st Air Flotilla, 1st Air Fleet, and was equipped with *Zero-Sen* 52s.

301st Naval Air Corps. (A fighter unit). Formed on November 5, 1943. During the spring and summer of 1944 it was based on Iwo Jima and attached to the 22nd Air Flotilla, 1st Air Fleet when it was disbanded on July 10, 1944. Equipped with *Zero-Sen* 52s during 1944.

302nd Naval Air Corps. (A mixed fighter unit). Formed on March 1, 1944, at the Yokosuka Naval Air Base. This unit operated a varied selection of fighters for the defence of Japan in 1944–45 including some *Zero-Sen* 52s which had been converted by unit maintenance crews for use as night-fighters. This entailed mounting a 20-mm. cannon obliquely—at 30° from the horizontal—behind the cockpit. The 302nd NAC was still in existence at the end of the Pacific War, when it was attached to the 71st Air Flotilla, 3rd Air Fleet.

331st Naval Air Corps. (A fighter unit). Formed on July 1, 1943, this unit saw service in the Netherlands East Indies and Malaya. On March 4, 1944, the 331st moved to the Marianas and was based principally on Saipan. After the US forces had captured the island, 331st NAC moved to the Palau Islands and was also at Singapore for a short period. Early in 1945, the unit was based in Japan where it was disbanded on May 15, 1945 when attached to the 28th Air Flotilla, 13th Air Fleet.

343rd Naval Air Corps. (A fighter unit). Formed on January 1, 1944, at the Matsuyama Air Base, on Shikoku, the unit was attached to the 61st Air Flotilla, 1st Air Fleet and moved to the Marianas on February 1, 1944, equipped with the *Zero-Sen* 52. The unit was disbanded on July 10, 1944. Another unit using the same designation was reformed in Japan in late 1944.

381st Naval Air Corps. (A mixed aircraft unit). Formed on October 1, 1943, this unit saw extensive service in Singapore and the Netherlands East Indies at various bases such as Kupang, Kendari and Bali. The unit was still in existence at the end of the Pacific War, attached to the 28th Air Flotilla, 13th Air Fleet. It used *Zero-Sen* 52s during 1944–45.

634th Naval Air Corps. (A mixed aircraft unit, including a fighter squadron). Formed at the Iwakuni Air Base, southern Honshu, on May 1, 1944, the 634th NAC was at the Mabalacat Air Base, Luzon, Philippines, on October 23, 1944. Operating *Zero-Sen* 52s, this unit returned to the Japanese home islands in late 1944 and became a seaplane unit on January 8, 1945.

721st Naval Air Corps. (A mixed bomber and fighter unit). Formed on October 1, 1944, at the Hyakurihara Air Base. Saw some service over Okinawa in early 1945. It was at the Kanoya Air Base, Kyushu, on February 11, 1945, and attached to the 5th Air Flotilla until the end of the Pacific War. In 1945 this unit became a *Kamikaze* Corps.

Genzan Naval Air Corps. (An operational training unit). Formed on August 15, 1944, at Wonsan Naval Air Base, northern Korea. It was a part training, part operational unit with a few *Zero-Sen* 52s on strength for operational training. The unit was still in existence at the end of the Pacific War, attached to the 10th Air Flotilla, 15th Training Air Fleet.

Tsukuba Naval Air Corps. (A mixed aircraft training unit). Formed on December 15, 1938. During 1945, it was equipped with *Zero-Sen* 52s at the Oita Air Base. The unit was still in existence at the end of the Pacific War, attached to the 71st Air Flotilla, 3rd Air Fleet.

Yatabe Naval Air Corps. (A mixed aircraft training unit). Formed on December 1, 1939. This unit employed Model 52s during 1944–45. Still in existence at the end of the Pacific War, attached to the 10th Air Flotilla, 15th Training Fleet.

Yokosuka Naval Air Corps. (A mixed aircraft unit). The oldest NAC in the Imperial Japanese Navy. In 1945 it had some Model 52s on strength for Home Defence.

ACKNOWLEDGEMENTS

The authors wish to acknowledge their most grateful thanks for the international assistance so generously given during the preparation of this Profile. *Recognition must be given to Major Robert C. Mikesh, USAF (Ret'd.), now of the Smithsonian Institution, Washington, D.C., without whose enthusiastic help this* Profile *could not have been undertaken in such detail.*

Specialists and members of Air-Britain *(The International Association of Aviation Historians) as usual made valuable contributions: Takeshi Miyawaki (Kyoto) and Toshio Fujita (Tokyo); Bruce Robertson, Malcolm Passingham and Waclaw B. Klepacki; Roger A. Freeman (U.S. Aviation Research Group); and Chris. Shores (Air Aces Research Group) who introduced the authors to Yasuho Izawa (Tokyo) —whose assistance in enhancing our own compilation of* Zero-Sen *unit histories is much appreciated.*

In respect of photographs, the authors wish to thank both Dr Rene J. Francillon (USA) and Heinz J. Nowarra (W. Germany) for their timely aid. A special mention must be made of the cooperation afforded the authors in the supply of photographs by the staffs of the National Archives (Washington, DC., USA) and the Photographic Section of the Imperial War Museum (London, England).

A remarkably effective study of Zero-Sen, *Model 52cs (A6M5c) 'warming-up' at Genzan, northern Korea, at the start of the new year of 1945. These Model 52cs were part of the IJNAF's Genzan Naval Air Corps.* (Photo: via Yasuho Izawa)

Bibliography is so extensive that only a selection of the more important references is possible. Magazines: Japan's "Aireview" and "Koku Fan" and Britain's "Air Pictorial". Books: "Encylopedia of Japanese Aircraft, Vol. 1"; "The Zero Fighter" & "Zero" by M. Okumiya, J. Horikoshi and M. Caiden (Cassell); "Divine Wind" by R. Inoguchi, T. Nakajima and R. Pineau (Hutchinson); and "Leyte Gulf – Armada in the Pacific" by D. MacIntyre (Purnell). Other sources included contemporary T.A.I.C. Reports and information from Mitsubishi Heavy Industries Co. Ltd.

Series Editor: CHARLES W. CAIN

TECHNICAL SPECIFICATION:
MITSUBISHI A6M5 NAVY TYPE O CARRIER FIGHTER, Model 52

Description
Carrierborne fighter.

Accommodation
Single-seat enclosed cockpit.

Powerplant
One Nakajima NK1F *Sakae* (Prosperity) Model 21, air-cooled 14-cylinder, two-row radial. Rated power for take-off, 1,130 h.p.; at 2.850 m. (9,350 ft.), 1,100 h.p.; and 6.000 m. (19,685 ft.), 980 h.p.

Propeller
Three-blade Sumitomo-Hamilton (U.S.-patent, Hamilton Standard constant-speed controllable-pitch) propeller of 3,05 m. (10 ft. $1\frac{1}{16}$ in.) diameter; pitch range, 29° (fine) and 49° (coarse).

Dimensions
Span, 11,00 m. (36 ft. $1\frac{1}{16}$ in.); length, 9,121 m. (29 ft. 11 $\frac{3}{32}$ in.); height, 3,509 m. (11 ft. $6\frac{1}{2}$ in.); wing area, 21,3 m². (229·59 ft.²).

Weights
Empty, 1.876 kg. (4,136 lb.); loaded maximum, 2.960 kg. (6,510 lb.). Loadings, wing, 128,3 kg/m². (26·3 lb/ft².); power, 2,4 kg/h.p. (5·3 lb./h.p.).

Performance
Maximum speed, 305 knots at 6.000 m. (351 m.p.h. at 19,685 ft.); cruising, 200 kt. (230 m.p.h.) at 6.000 m. Climb to 6.000 m. in 7 min. 1 sec. Service ceiling, 11.740 m. (38,520 ft.). Range, maximum, 1,017 nautical miles (1,171 statute miles) at 200 kt. Landing speed, 69 kt. (79.35 m.p.h.).

Fuel capacity
Internal, 540 litres (189 Imperial gallons). External, on centreline carrier, one jettisonable tank holding 330 l. (72·6 Imp. gal.). Oil tank in powerplant bay, 61,5 l. (13·5 Imp. gal.).

Armament
Forward fuselage, synchronized to fire through propeller disc, two × 7·7-mm. Type 97 machine-guns; 700 rounds per gun of belt-fed cartridges. Wings (total two cannon on Model 52), two × 20-mm. Type 99 Model 2 cannon; 100 shells each, drum-fed. External (wing) stores, two × 60-kg. or 30-kg. (132-lb. or 66-lb.) bombs.

Radio equipment
(Model 52). Type 3 Ku Mark 1 Transmitter and Receiver with frequency range of 5 to 10 Megahertz (formerly Megacycles per second).

Construction
All-metal, low-wing monoplane with fabric-covered control surfaces and semi-monocoque fuselage. Retractable mainwheels and tailwheel. (Model 52). No pilot armour protection or fuel system fire extinguishers or self-sealing fuel tanks.

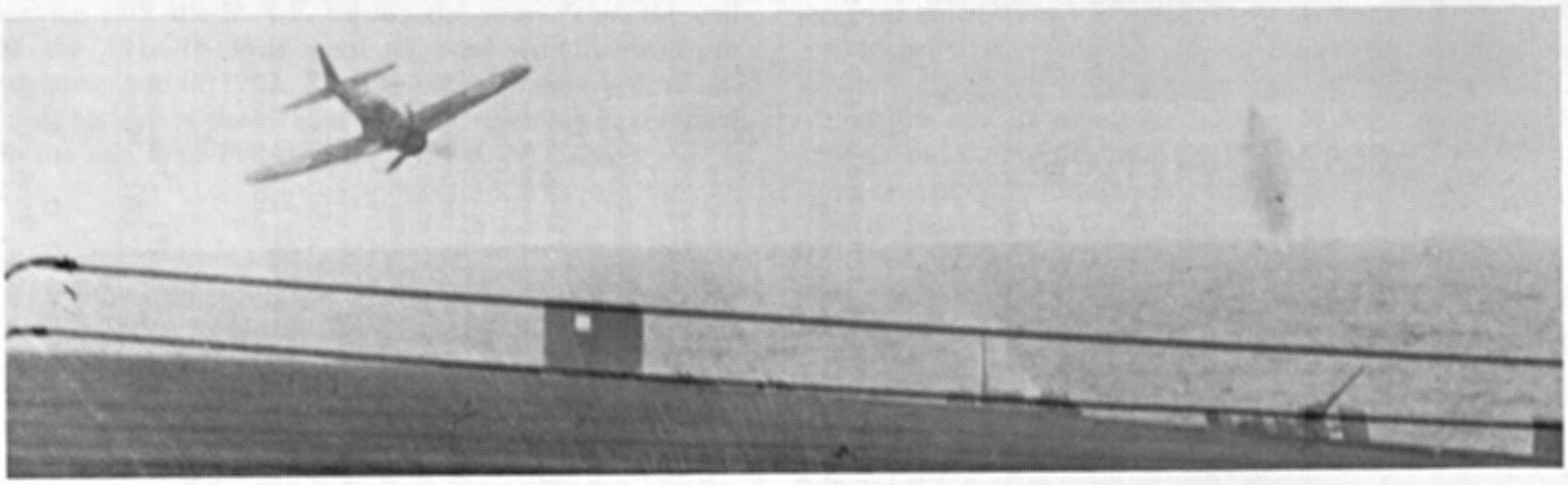
TABLE 1: PRODUCTION OF MITSUBISHI A6M5 TO A6M8 FROM 1943 TO 1945

Period	Production by Prime Manufacturers	
	Mitsubishi	Nakajima
April 1943 to March 1944	1,164	2,268
April 1944 to March 1945	1,145	2,342
April 1945 to August 1945	119	885
Totals:	2,428	5,495
Grand total:	7,923	

NOTE: Production of all models from March 1939 to August 1945 totalled 10,449 examples of the *Zero-Sen.*

Ground photographs of bomb-carrying Kamikaze *A6M5s appear to be few in number. This view, virtually in silhouette, nevertheless shows the fuselage-mounted 250-kg. armour-piercing bomb in position.* (Photo: *Koku Fan*)

The moment of truth. An unusually clear photograph of a Zero-Sen, *Model 21 (obsolete A6M2) pilot's valiant near-miss on October 25, 1944 during the second strike of the initial* Kamikaze *onslaught against the US Navy in the Pacific. The cool-headed photographer was on board the A6M2's target, the escort carrier, USS* White Plains. *Wreckage was strewn over the flight deck.*
(Photo: US Navy Dept., National Archives, ref. 80–G–288882)



One of the finest archive photos to be unearthed by the authors (writes the Editor) *is this magnificent study of a paint-stripped, highly-polished* Zero-Sen, *Model 52, at R.A.F. Station Seletar, Singapore, in 1945. Heat-resistant panels behind the exhaust stubs are in evidence. The inscription below the cockpit reads: 'Technical Air Intelligence Center, A.I.2(G), VUFF'. Dept. 2(G) of British Air Intelligence was very well-known to artist Castle at this period, but 'Vuff' he cannot recall. In the background* (left) *with* Hinomaru *markings, a Kawasaki Ki-61* Hein *(Swallow: Allied 'Tony') and* (right) *a Grumman TBF Avenger and, complete with 'Grim Reaper' nose badge, TAIC No. 10, a Mitsubishi Ki-46-II ('Dinah')—see* Profile *No. 82.*

(Photo: US Navy Dept., National Archives, ref. 80–G–192152)

TABLE 2: SPECIFICATION DETAILS OF MITSUBISHI A6M5 TO A6M8 ('ZERO-SEN'/'ZEKE')

Navy short designation	A6M5	A6M5a	A6M5b	A6M5c	A6M6c	A6M7	A6M8c
Navy model number	Model 52	Model 52a	Model 52b	Model 52c	Model 53	Model 63	Model 54c
Span metres	11,00	11,00	11,00	11,00	11,00	11,00	11,00
Span feet and inches	36′ 1 1/16″	36′ 1 1/16″	36′ 1 1/16″	36′ 1 1/16″	36′ 1 1/16″	36′ 1 1/16″	36′ 1 1/16″
Length metres	9,121	9,121	9,121	9,121	9,121	9,121	9,237
Length feet and inches	29′ 11 3/32″	29′ 11 3/32″	29′ 11 3/32″	29′ 11 3/32″	29′ 11 3/32″	29′ 11 3/32″	30′ 3 5/8″
Motor	Nakajima Sakae Model 21	Nakajima Sakae Model 21	Nakajima Sakae Model 21	Nakajima Sakae Model 21	Nakajima Sakae Model 31A	Nakajima Sakae Model 21 or 31	Mitsubishi Kinsei Model 62
H.P. at rated altitude metres	1,100@ 2.850	1,100@ 2.850	1,100@ 2.850	1,100@ 2.850	1,100@ 2.850	1,100@ 2.850	1,340@'2.100
H.P. at rated altitude feet	@ 9,350	@ 9,350	@ 9,350	@ 9,350	@ 9,350	@ 9,350	@ 6,890
Weights empty kilogrammes	1.876	1.894	—	2.155	2.050	—	2.150
Weights empty pounds	4,136	4,167	—	4,751	4,519		4,740
loaded kilogrammes	2.733	2.743	—	3.150	3.000	3.150	3.150
loaded pounds	6,025	6,047	—	6,945	6,614	6,945	6,945
Maximum speed at rated altitude knots/metres	305/6.000	302/6.000	—	302/6.000	293/6.400	—	309/6.000
Maximum speed at rated altitude m.p.h./feet	351/19,685	348/19,685	—	348/19,685	337/21,000	—	356/19,685
Rate of climb minutes & seconds	7′ 1″	7′ 1″	—	5′ 50″	9′ 53″	—	6′ 50″
Rate of climb to metres/feet	6.000/19,685	6.000/19,685	—	5.000/16,405	8.000/26,250	—	6.000/19,685
Service ceiling metres/feet	11.740/38,520	11.740/38,520	—	11.050/36,255	10.150/33,300	—	11.200/36,745
Range at cruising speed nautical miles/knots	1,017/200	1,037/200	—	1,141/200	830/200	—	—
Range at cruising speed miles/m.p.h.	1,171/230	1,194/230	—	1,314/230	956/230	—	—
Armament (F) = Fuselage (W) = Wings machine-guns	(F) 2 ×7,7-mm.	(F) 2 ×7,7-mm.	(F) 1 ×7,7-mm. (F) 1 ×13-mm.	(F) 1 ×13-mm.	(F) 1 ×13-mm.	(F) 1 ×13-mm.	(W) 2 ×13-mm.
Armament (F) = Fuselage (W) = Wings cannon	(W) 2 ×20-mm.	(W) 2 ×20-mm.	(W) 20 ×20-mm.	(W) 2 ×13-mm. (W) 2 ×20-mm.	(W) 2 ×13-mm. (W) 2 ×20-mm.	(W) 2 ×13-mm. (W) 2 ×20-mm.	(W) 2 ×20-mm.
Bomb load (F) = Fuselage (W) = Wings	(W) 2 ×30 or 60-kg. ×66 or 132-lb.	(W) 2 ×30 or 60-kg. ×66 or 132-lb.	(W) 2 ×30 or 60-kg. ×66 or 132-lb.	—	—	(W) 2 ×60-kg. ×132-lb. (F) 1 ×250 or 500-kg. ×550 or 1,100-lb.	(W) 2 ×60-kg. ×132-lb. (F) 1 ×500-kg. ×1,100-lb.
Rocket projectiles (air-to-air missiles)	—	—	—	(W) 4 ×30-kg.	(W) 4 ×30-kg.	—	—
Jettisonable fuel tanks litres	(F) 1 ×330	(F) 1 ×330	(F) 1 ×330	(F) 1 ×330	(F) 1 ×330	(W) 2 ×150	(W) 2 ×350
Jettisonable fuel tanks Imp. gallons	× 73	× 73	× 73	× 73	× 73	× 33	× 77