

Battle against the Kamikaze

The moment a kamikaze struck USS Suwannee on 26 October 1944, the second strike on the ship in two days



August 1940 – Air Defence

- Admiral King had become increasingly aware of the Navy's unreadiness for air attack. Quickly earning Edison's confidence, he received the Secretary's blessing to oversee a complete updating of the fleet's antiaircraft defenses.
- These concerns were sharpened by the numerous British ships sunk by German aircraft in early 1940.
- After several months of ad hoc work by King and three assistants, the process was formalized on 9 August 1940, when the Navy Department set up the Antiaircraft Defense Board. This "King Board" reported on 26 December that lack of adequate automatic weapons was "the most serious weakness in the readiness of the navy for war."
- With this drastic assertion, and in true King fashion, he dominated antiaircraft development, controlling every detail of the work and stepping on all of the toes necessary to get things done. He recommended \$300 million for antiaircraft improvements in the fleet, and Carl Vinson's House Appropriations Committee responded with uncharacteristic speed.
- King personally reviewed the plans of each type of Navy ship and dictated the shipboard installations that would have to be removed to make way for the guns. It was said to be "ruthless surgery," but with the authority conferred by the Secretary he cut through all the usual delays with changes described as "quick and dirty." He was said to have sited AA weapons on every bit of deck big enough for a poker school to gather.
- When King took over as Commander in Chief, United States Fleet (COMINCH), a few days after Pearl Harbor, antiaircraft defense remained one of his top priorities.



Secretary of the Navy Charles Edison, center, and his aide, Captain Morton L. Deyo, right, accompanied Rear Admiral Ernest J. King on an inspection tour of the fleet in April 1940.

September 1940 – Air Defence

- An early form of magnetron was invented in 1910. However, the first truly successful example was developed in the USSR in 1936, which achieved 300 watts at 3 GHz (10 cm wavelength).
- The cavity magnetron was radically improved by John Randall and Harry Boot, under the direction of Mark Oliphant, at the University of Birmingham, England in 1940.
- They invented a valve that could produce multi-kilowatt pulses at 10 cm wavelength, an unprecedented achievement.
- The high power of pulses from the device made centimeter-band radar practical, with shorter wavelength radars allowing detection of smaller objects from smaller antennas.
- The compact cavity magnetron tube drastically reduced the size of radar sets so that they could be more easily installed in night-fighter aircraft, anti-submarine aircraft and ships.



John Randall



Harry Boot

September 1940 – Air Defence

- An early 10 kW version, built in England was taken on the Tizard Mission to America in September 1940.
- As the discussion turned to radar, the US Navy representatives began to detail the problems with their short-wavelength systems, complaining that their klystrons could only produce 10 W. With a flourish, "Taffy" Bowen pulled out a magnetron and explained it produced 1000 times that.
- Bell Telephone Laboratories took the example and quickly began manufacturing copies, the first thirty in October 1940.
- Before the end of 1940, the Radiation Laboratory had been set up on the campus of MIT to develop various types of radar using the magnetron.



GEC E-1189 Magnetron No.1 (No. 12 was taken to America on the Tizard Mission).

September 1940 – Air Defence

- For an anti aircraft system to achieve a damaging hit a visual or radar rangefinder needs to determine the correct height and range to target, a system needs to calculate the time of flight to the identified height and range and the crew need to set the shell's fuze to the correct time.
- There is a lot that can go wrong in this process.
- At the start of the Blitz, it was estimated that it took 20,000 rounds to shoot down a single aircraft.
- Photo: The ammunition relayer at rear has just passed the shell to the second relayer (hand on shell), who has inserted it into the fuse setter and struck the trip leaver with his left hand.



September 1940 – Air Defence

- British military researchers at the Telecommunications Research Establishment (TRE) conceived of the idea of a proximity fuze in the early stages of the War.
- Their system involved a small, short range, Doppler radar. Tests were then carried out with rockets. However, British scientists were uncertain whether a fuze could be developed for anti-aircraft shells, which had to withstand much higher accelerations than rockets.
- The British shared a wide range of possible ideas for designing a fuze with the United States during the Tizard Mission in September 1940



Sir Henry Tizard chemist, inventor and Rector of Imperial College.

November 1940 – Air Defence

- The light, free-swinging 20mm machine gun, which the Navy adopted in November 1940, was a product of the Oerlikon Machine Tool Works in Switzerland, although our guns were all manufactured in the United States.
- As automatic weapons go, it was unbelievably simple and almost trouble-free.
- At a cyclic rate of 480 rounds per minute, and using a spring-loaded drum of 60 rounds, the machine gun kept firing as long as the firing lever was held back or until something broke. And amazingly, there were only five parts that could break; four of these were located together on the breechblock.
- Though these occurrences became familiar and seemed frequent in the huge volume of AATC firings, from my own later experience in what seemed like heavy battle engagements, stoppages were rare.
- The relative disadvantages of the 20mm were its short range and limited destructive power of its small explosive shell.
- The question was, How do you get hits?
- Lieutenant Bob Wallace, USN, AATC Bermuda.



Close-up of a 20mm anti-aircraft mount.

4 January 1941 – Air Defence

- Before the end of 1940, the Rad Lab was started at MIT, with Lee A DuBridge (photo), the President of the California Institute of Technology, as Director and subsequently almost all radar development in the U.S. was in centimeter-wavelength systems.
- The laboratory's first months tested whether microwave radar could work at all by a self-imposed January deadline: build a working radar system around the British cavity magnetron.
- No American had built a microwave radar, and the short wavelengths required entirely new components. The laboratory's initial staff—physicists, not radar engineers—improvised as they went.
- On January 4, 1941, two days ahead of schedule, the first test system came to life on the roof of MIT's Building 6. An unwieldy transmitting antenna occupied one end of the rooftop, with the receiving aerial on the other, shielded from its counterpart by a loose screen cage. Within minutes of being switched on, the system registered echoes from the Boston skyline across the Charles River.



May 31, 1941 – Air Defence

- While parallel British and Canadian programs aimed merely to add microwave radar to existing manual aircraft tracking, the Rad Lab's physicists proposed something more ambitious.
- Louis Ridenour pushed for a fully automatic system.
- He assembled a team to develop a radar that would lock onto targets and follow them through evasive maneuvers without human intervention.
- The cornerstone was conical scanning, a technique in which a rotating antenna beam traced a cone in space. A target on axis returned a constant signal; any deviation produced amplitude variations that servomotors converted into corrections, automatically realigning the radar.
- To test the concept, the team conscripted a servo-driven gun turret from the B-29 program and mounted their prototype in the Building 6 rooftop laboratory.
- Local traffic was too sparse to provide reliable test targets, so Harvard geologist Dave Griggs agreed to fly his Luscombe aircraft around Cambridge for \$10 an hour, simulating an enemy.

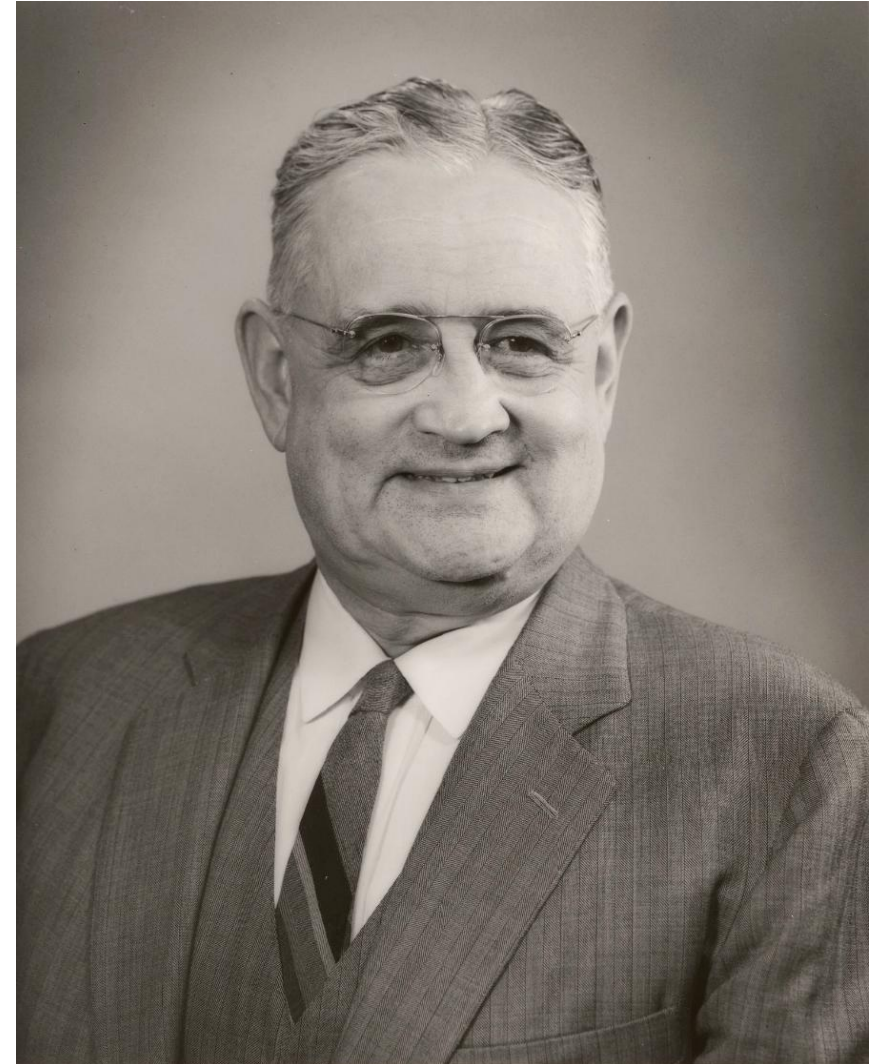


On May 31, 1941, with Davenport in the back seat radioing observations, the team achieved the first automatic tracking of an aircraft by radar.

June 1941 – Air Defence

- As it turned out, the US Navy had a secret weapon. His name was Dr. Charles Draper of MIT, creator of the Mark 14 sight and later other marvels. Like the guns it was meant to direct, the Mark 14 was about as simple and reliable as one could imagine.
- Draper had been working on an experimental gunsight that incorporated the rate-of-turn gyroscope that Sperry had patented for use in aircraft instruments.
- In June 1941, the Bureau of Ordnance asked Sperry to supply prototypes of a compact gyroscopic gunsight that could be mounted on the Oerlikon 20mm gun.
- The Mk 14 combined a reflector gunsight of the type found in fighter planes with two rate-of-turn gyroscopes—one for traverse and the other for elevation. The reflector gunsight was the original “head-up” display, where the image of an aiming reticle was reflected by an angled mirror onto a piece of coated glass, within the pilot’s line of sight but without obstructing his view. To improve deflection shooting when engaging a moving target, a gyroscope shifted the reticle image so it matched the target’s rate of angular velocity.
- Small windows on the front and back allowed the gunner to see the reticle image on the reflector sight inside and view the target. A range knob was located on the lower right side.
- Lieutenant Bob Wallace, USN, AATC Bermuda.
- Among the other marvels was the “Apollo Guidance Computer” which enabled the moon landings.

Jerry McBrien 2026



4 August 1941 – Air Defence

- The Navy ordered the first 12 experimental Draper sights from MIT on 4 August 1941
- The Oerlikon 20-mm cannon was crewed by two men: a gunner and a range setter. The gunner's job was to smoothly track the motion of his target in the sky, keeping the reticle on it, and then fire his gun. The sailor setting the range received updated information from the air-search radar and adjusted the setting as needed based on whether the target was approaching and closing the range or flying away.
- The greenest fire controlman third-class could take care of the sight, adjusting it to bore sight, changing reticles, or doing anything short of fooling with the two gyroscopes.
- The Mark 14 sight had to move steadily and, above all, smoothly. Those two gyroscopes knew exactly what they were doing and they tried their best to respond to the directions they received. Given smooth and steady movement, they worked like a charm.
- Lieutenant Bob Wallace, USN, AATC Bermuda.



November 1941 – Air Defence

- The prototype AATC was the Antiaircraft Training Center at Dam Neck, Virginia, established only about a week before Pearl Harbor.
- At least 20 AATCs were established wherever gun crews could use instruction and, later especially, target practice.
- In addition to several stateside locations, they eventually extended from Guantanamo and Bermuda to Guadalcanal and Guam.
- All followed basically the same plan—a firing line mounting all calibers of antiaircraft guns, facing the open sea to afford an unobstructed field of fire at towed sleeve targets.
- Sheds behind the firing line stored the heavy wooden tables for conducting the instruction that preceded the actual firing.
- Particularly in the early stages of the war, King had a tendency to micromanage what he regarded as key activities. These included instruction in antiaircraft gunnery at antiaircraft training centers (AATCs), which he kept under his direct supervision until April 1943.
- Lieutenant Bob Wallace, USN AATC Bermuda.



An aerial view of Antiaircraft Training Center, Bermuda (looking west northwest). The firing line runs along the beach. The house, lawn, and gardens are in the background.

February 1942 – Air Defence

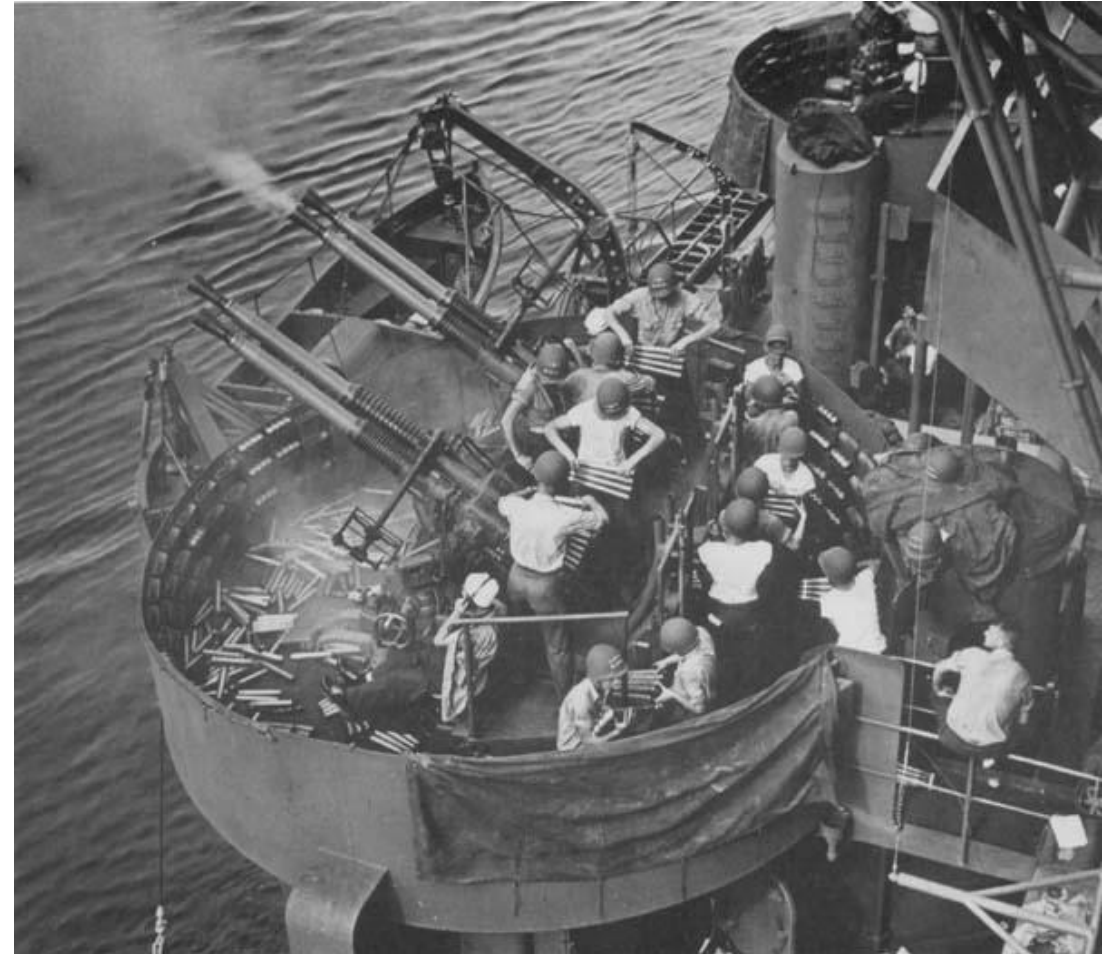
- When tested at Fort Monroe in February 1942, the prototype aircraft tracking radar located objects within six-hundredths of a degree and twenty yards in range.
- The Army ordered over 1,200 units, designating the radar SCR-584.
- Connected to the Bell Labs M-9 predictor, which calculated where targets would be when shells arrived, the system transformed anti-aircraft gunnery.



Figure 22. Exterior View of Radio Set SCR-584.

June 1942 – Air Defence

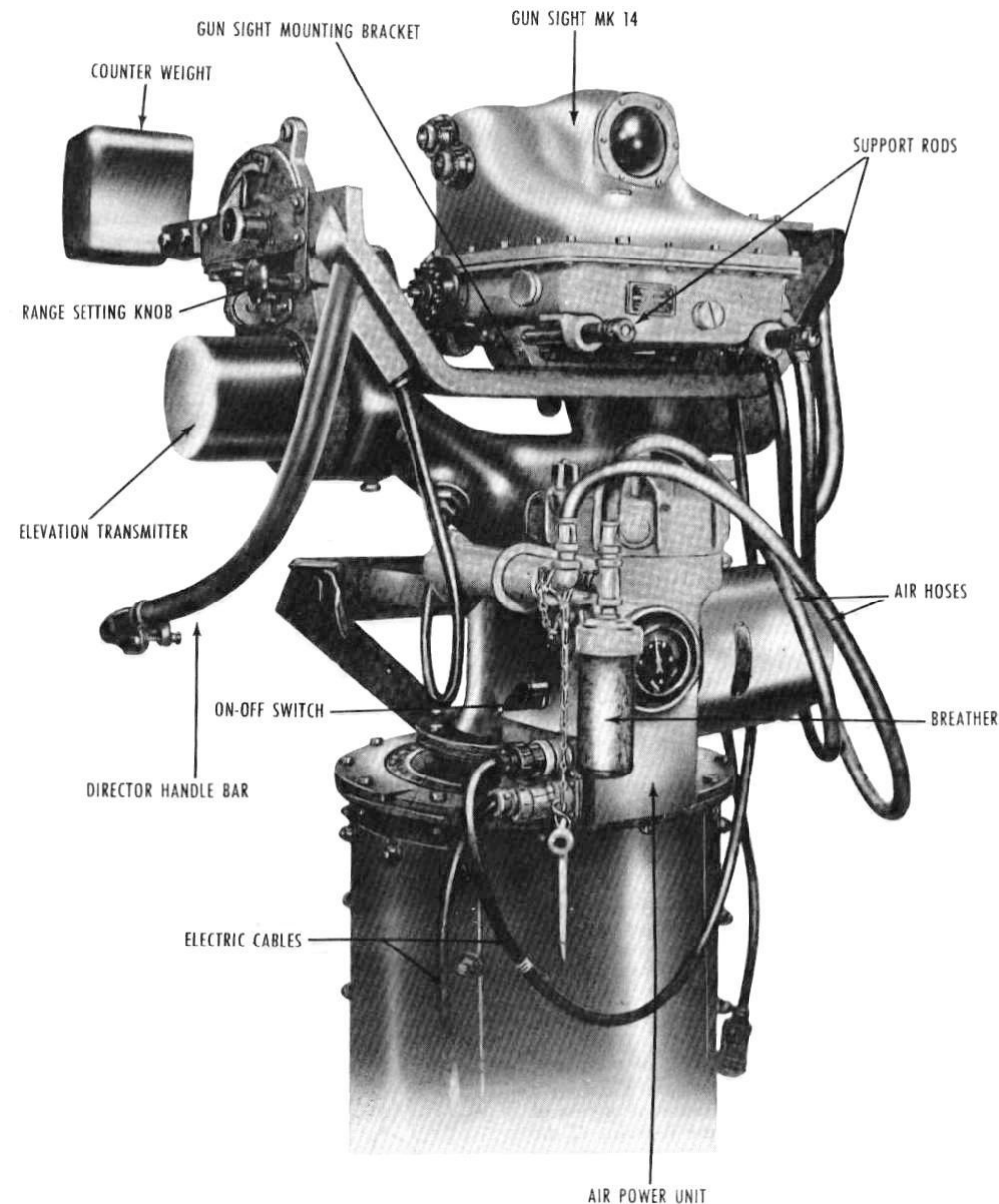
- The great automatic cannon of World War II was the 40mm Bofors. In early versions used by the British and US armies, it had an air-cooled single barrel. That feature was not exactly what the US Navy had in mind, but the breech mechanism—the heart of any gun—was, along with that of the Oerlikon, about as simple and trouble-free as a machine cannon could be.
- The gun's loading arrangement seemed almost made for multiple mounts, which was exactly what our people had in mind. The loader stood beside the breech and simply dropped a four-round clip into a loading chute. Since the chute would hold two clips, it was easy to keep the gun firing. The beauty of the loader standing at the side was that it was possible to mount the guns very close together as twins, with the loaders standing on the outside facing each other.
- This positioning made it possible to form a quad mount, with the pair of twins just far enough apart for the two inboard loaders to stand back to back.
- The US Navy went a step further by encasing the barrels in water jackets with circulating pumps, allowing the gun to fire forever.
- Lieutenant Bob Wallace, USN, AATC Bermuda.



The 40mm gun crew of a newly commissioned light cruiser undergoes anti-aircraft training, January 1944

June 1942 - – Air Defence

- The Mk 14 Sight was used in combination with the Mk 51 director to remotely control quad 40-mm Bofors guns.
- The gun mount followed the director's movements through a system of synchro motors.
- In December 1941 after conferring with Sperry engineers, it was decided to abandon the barber-chair design, which involved the objectionable feature of a seat for the operator, and start anew on a "handlebar" design officially designated as the Gun Director Mark 51.
- A production order for 1,000 Mark 51 directors was authorized in January 1942.
- The first Mark 51 was shipped to Dahlgren for testing between 4 and 7 May 1942, where it received Proving Ground approval.
- Within a month, the first production Mark 51 directors were being delivered to the Fleet.
- Lieutenant Bob Wallace, USN, AATC Bermuda.



12 August 1942 – Air Defence

- In the US the National Defense Research Committee focused on radio fuzes for use with anti-aircraft artillery, where acceleration was up to 20,000 g as opposed to about 100 g for rockets. In addition to extreme acceleration, artillery shells were spun by the rifling of the gun barrels to close to 30,000 rpm, creating immense centrifugal force.
- The NDRC assigned the task to the physicist Merle Tuve at the Department of Terrestrial Magnetism. Work on the radio shell fuze was completed by Tuve's group, known as Section T, at The Johns Hopkins University Applied Physics Lab.
- Working with Western Electric Company and Raytheon, miniature hearing-aid tubes were modified to withstand this extreme stress.
- A simulated battle conditions test was started on 12 August 1942. USS Cleveland tested proximity-fuzed ammunition against radio-controlled drone aircraft targets over Chesapeake Bay.
- The tests were to be conducted over two days, but the testing stopped when all the drones were destroyed early on the first day. The three drones were destroyed with just four projectiles.

12 August 1942 – Air Defence

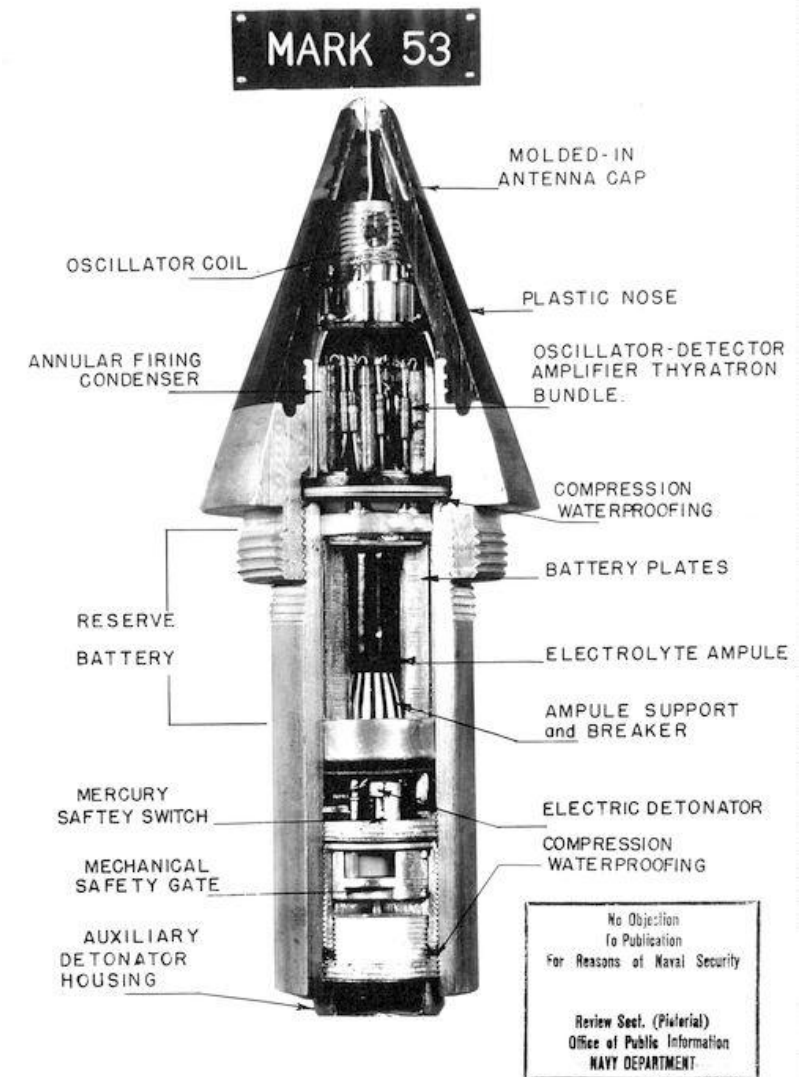
- Defence committed to spending \$60 million for VT fuzes in 1942,
- The first large scale production of tubes for the new fuzes was at a General Electric plant in Cleveland, Ohio formerly used for making Christmas-tree lamps. Fuze assembly was completed at General Electric plants in Schenectady, New York and Bridgeport, Connecticut.
- Over 100 American companies were mobilized to build some 20 million shell fuzes.
- Production of Naval fuzes was contracted to the Wurlitzer company at their barrel organ factory in Tonawanda, New York.



Merry-go-round organ by Wurlitzer, 1890-1900

12 August 1942 – Air Defence

- The proximity fuse was a secret guarded to a similar level as the atom bomb research.
- The Pentagon refused to allow the use of the fuzes anywhere they might fall into the hands of the Germans.



Proximity fuze MK53 removed from shell. Circa 1950s.

24 August 1942 – Battle of the Eastern Solomons

- At 16.02 Enterprise's radar briefly showed a large bogey bearing 320 degrees distant 88 miles. These radars gave no direct information on the target's height. Operators estimated height as 12,000 feet. More fighters were flown off until there were 53 in the air. Returning search planes were warned to stay away.
- At 16.19 the bogey reappeared on the radar screen.
- At 16.29 Gunner Brewer gave a "Tallyho" on sighting the attackers bearing 300 degrees distant 25 miles.
- The radar picture became completely blurred as the attackers got mixed up with defending fighters and returning search planes and as the carriers increased speed and started evasive maneuvering.
- A breakdown of radio discipline on the fighter direction circuit, which the controllers shared with all 53 Wildcats made the controllers job almost impossible.
- The Japanese were actually at 16,000 feet so most of the defenders, who had been positioned at 12,000 feet were unable to intercept the bombers before they pushed over.
- Two flights of Wildcats had been high enough to intercept and claimed nine Vals and a Zero shot down.

24 August 1942 – Battle of the Eastern Solomons

- At the Battle of the Eastern Solomons, neither side had been able to defend their carriers against an air attack.
- US Air defence radar and the fighter control, IFF and radio systems all had serious technical limitations.
- The key to winning appears to be to find the opposition carriers before they find yours.
- Finding even something as big as a carrier task force in the Pacific, absent precise intelligence, remains a non trivial problem.



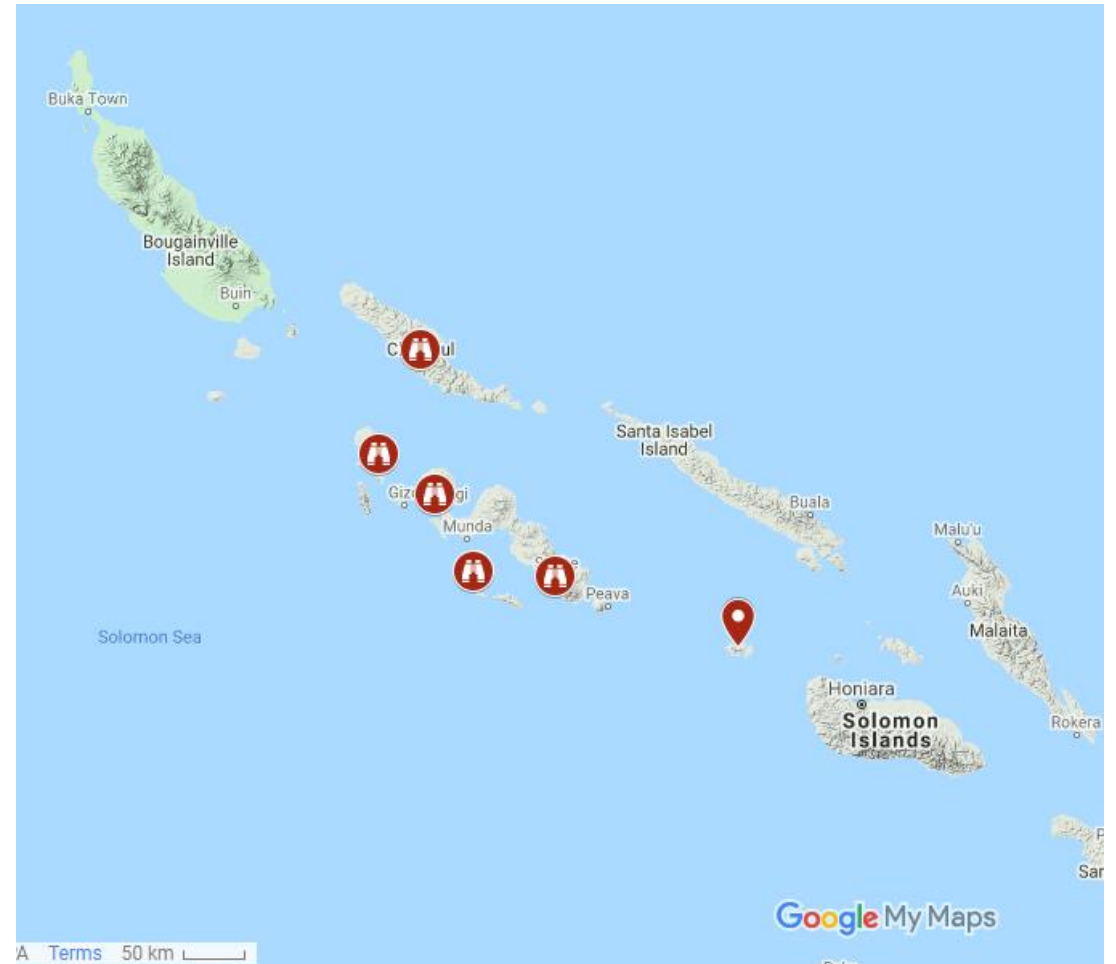
26 November 1942

- On Thanksgiving Day, 1942, Admiral Nimitz issued a directive (Tactical Bulletin 4TB-42) calling for the establishment of a "Combat Operations Center" on every warship.
- Explaining "Maximum combat efficiency by individual ships and task organizations can best be attained through full utilization of all available sources of combat intelligence." The COC would receive, assimilate, and evaluate information.
- What form this new structure would take, Nimitz and his staff did not say.



4/5 January 1943 – Air Defence

- Coast watchers gave valuable early warning but effective air defence requires fighter direction with radar and radio.
- As the Allies moved to retake Japanese held islands in the Solomons and New Guinea. Invasion forces were moving into waters without much maneuvering room, as well as closer to large Japanese bases.
- It was not a good idea to bring fleet carriers into such waters where they were within the enemy's aerial striking distance.
- The first solution was moving fighter direction to cruisers supporting landings, and providing CAP from island bases such as Guadalcanal, or from smaller escort carriers.



4/5 January 1943 – Air Defence

- One of the first cruiser Fighter Direction and land based air operations, the bombardment of Munda airfield on New Georgia Island on 4/5 January 1943, revealed a weakness in IFF.
- The cruiser Nashville was assigned fighter direction but failed to detect a Japanese raid that came in above and close behind its own combat air patrol that was showing IFF. It was found that an aircraft located less than five degrees in bearing on either side of a plane showing IFF, and at a similar range would appear on the radar scope as a friendly IFF response.



The U.S. Navy light cruiser USS Nashville (CL-43) off the Mare Island Naval Shipyard, California (USA), on 4 August 1943.

January 1943 – Air Defence

- Nimitz' "Combat Operations Center" attracted furious opposition from senior officers claiming that the bridge was and would always be the Combat Operations Center.
- Cominch Admiral King (photo) had to intervene, reinforcing the concept but conceding a change in name to "Combat Information Center".



29 January 1943 - Air Defence

- On the 29th January 1943, the cruisers Chicago and Wichita were escorting a Guadalcanal reinforcement convoy protected by fighters from Enterprise and the escort carriers Chenango and Suwannee, and enemy snoopers were apparently tailing the force.
- CINCPAC had messaged to the OTC that trailers were probably on his tail.
- The FDO on Wichita, who had fighter control and was keeping a detailed plot of the unidentified planes, requested permission of the OTC to use the fighter net to send protecting CAP to intercept the bogies.
- Hesitant to break radio silence, the OTC elected instead to launch a fighter division from one of the carriers, without fighter direction, to find the snoopers and identify them.
- In his mind they were most likely friendlies not showing IFF, and he doubted enemy airplanes were nearby.
- At nightfall, the searchers returned to the carrier and reported no contact, but that night Japanese torpedo planes attacked, putting a torpedo into Chicago.
- The cruiser remained afloat, and the cruiser Louisville took her under tow.



The U.S. Navy escort carrier USS Suwannee (CVE-27) underway at 17 knots in the Puget Sound, Washington (USA), 31 January 1945. One of the class of 4 converted Oilers. 18 knots, 25 – 32 aircraft.

30 January 1943 - Air Defence

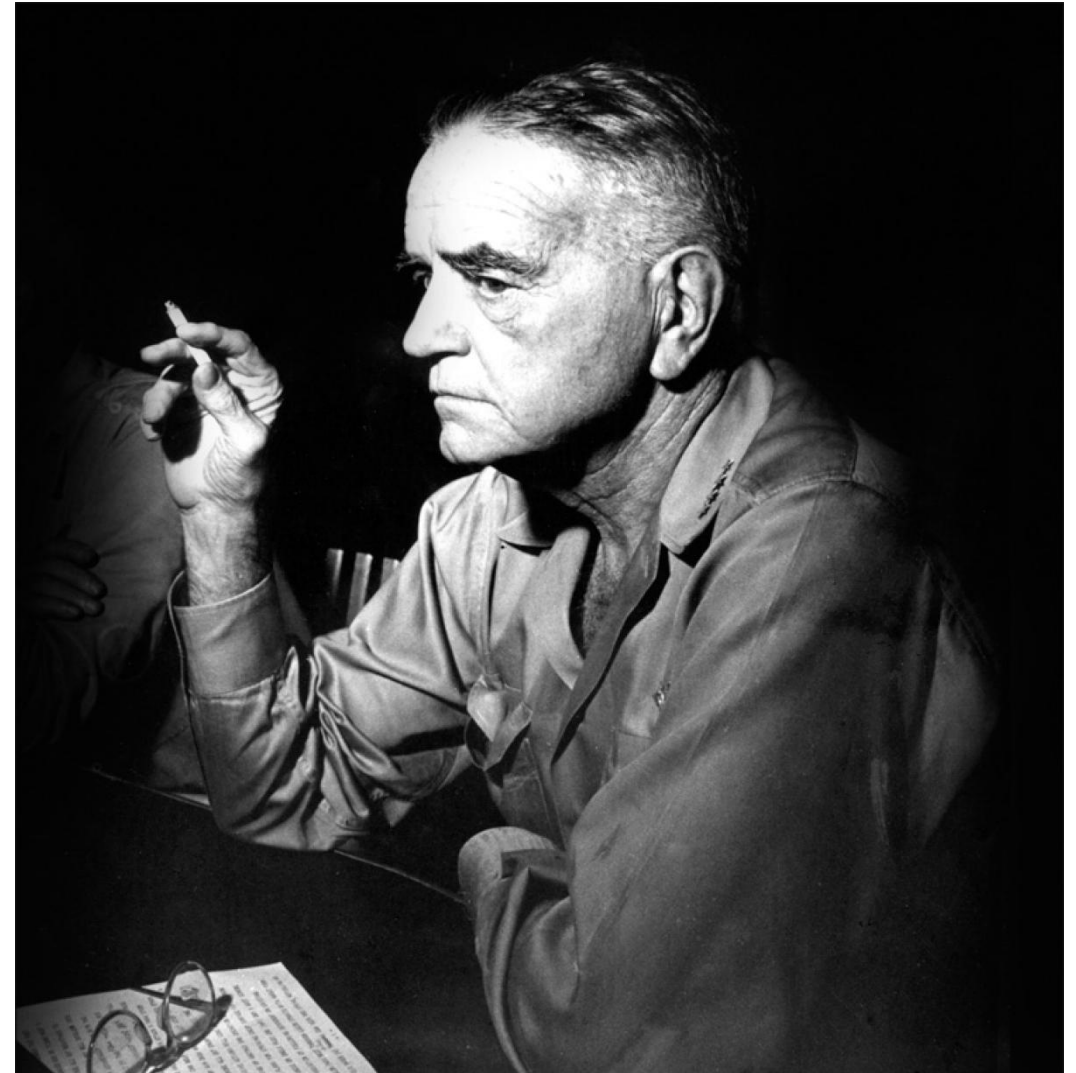
- Louisville took Chicago under tow, transferred the tow to the ocean going tug Navajo the next day.
- Even though she was under strong air cover, Japanese torpedo planes again attacked Chicago without being detected, and in spite of heavy Japanese aircraft losses, hit her with four torpedoes, sending the cruiser under.



USS Chicago low in the water on the morning of 30 January 1943, from torpedo damage inflicted the night before

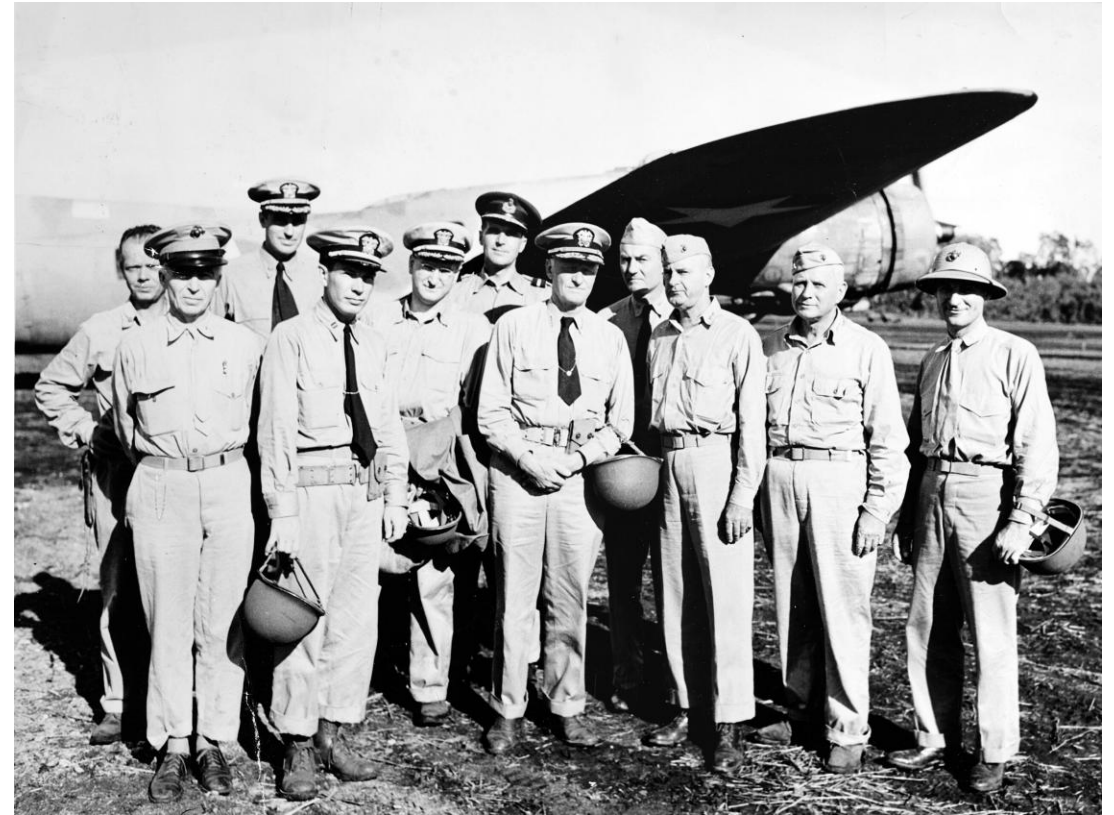
30 January 1943 - Air Defence

- COMSOPAC, Halsey, noted that the non-use of fighter direction communications contributed to Chicago's sinking and continued:
- There should be no hesitancy to break radio silence for direction of fighters under these circumstances....If the enemy already has the information, as indicated in this case by the presence of enemy planes in the area and by the ultimate attack, the imposition of radio silence is unsound.
- Halsey went on to complain that if the FDO had "super frequency [VHF]" radios there would have been no concern about breaking radio silence.
- "For over a year recommendations have been made, based on combat experience, for the production of ultra high frequency and multi channel, quick shift radio equipment. To date operating forces are still suffering from most unsatisfactory equipment."
- COMSOPAC observed that if all friendly planes could be counted on to use IFF at all times, the OTC would have known that the unidentified trailers were enemy.
- He stated the problem was "neglect on the part of aircraft units to provide proper maintenance and continuous adjustments of the equipment" and also because of "pilots not keeping IFF turned on throughout each flight."



30 January 1943 - Air Defence

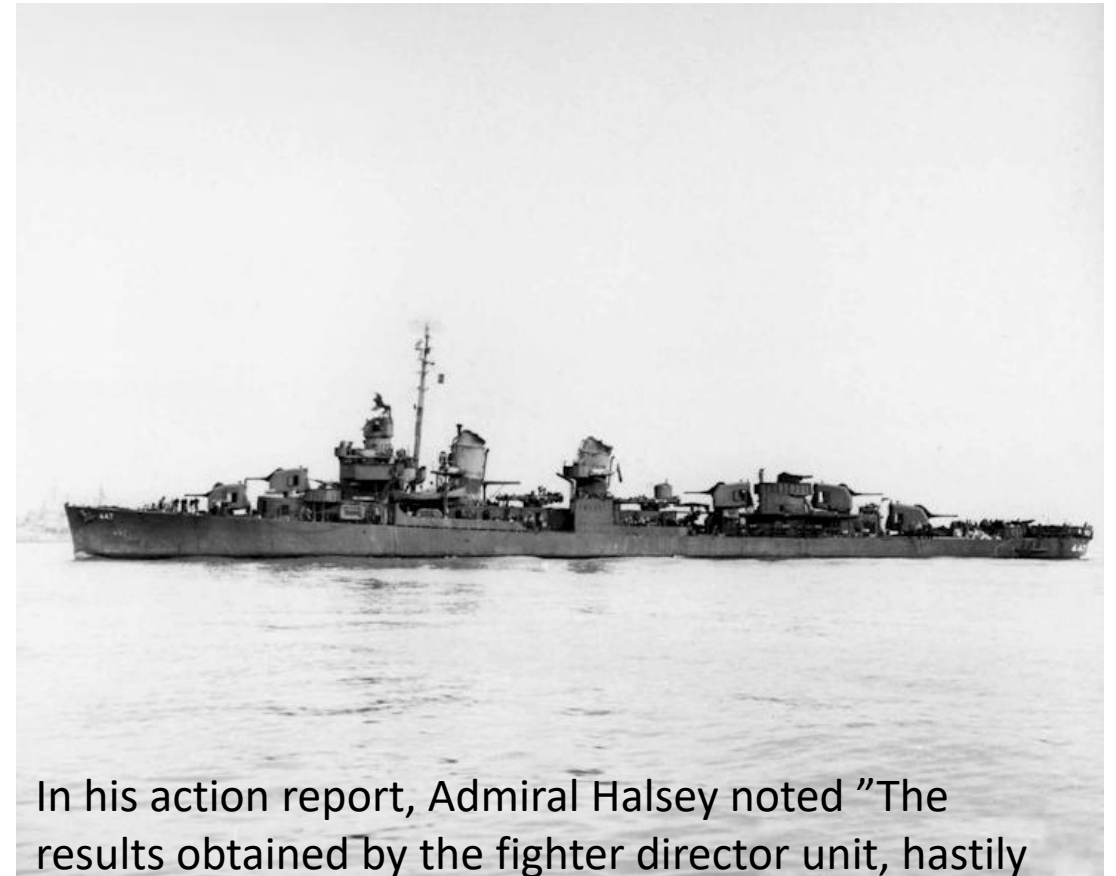
- Reflecting on the inability to detect the second attack on Chicago, Admiral Nimitz wrote:
- “It is axiomatic that all planes in the vicinity of the task force must be continuously tracked and plotted and information on our own planes continuously disseminated to the forces.
- A properly run combat information center as prescribed in 4TB42 should eliminate most of the foregoing deficiencies.”



Nimitz with officers at Henderson Field, Guadalcanal, 30 September 1942

7 July 1943 – Air Defence

- Cruisers with their big guns were in demand for other work such as shore bombardment and surface engagement.
- The fleet was now getting new destroyers with SC-2 radar and well equipped CICs that could function as well or better than the improvised CICs on the older cruisers.
- The new Fletcher Class destroyer Jenkins (photo) embarked a team of four FDOs and two enlisted operators at Guadalcanal to provide fighter direction to cover the invasion of Rendova Island.
- Land based fighters were to provide the CAP.
- After the landing, Jenkins' skipper noted in his action report that the team had performed extremely well.
- He reported that they had intercepted all enemy air raiders before they reached attack position, and in the final attack a few torpedo planes did get through, but the ships guns easily dealt with them. He wrote:
- It is believed that if the combat air patrol is adequate, interception can be made in sufficient time to neutralize an attack: the problem appears to be that of providing sufficient fighters rather than improving radars.



In his action report, Admiral Halsey noted "The results obtained by the fighter director unit, hastily assembled on board the USS Jenkins and working in an area partly enclosed by land, are very encouraging. Rapid developments along these lines will be highly remunerative."

September 1943 – Air Defence

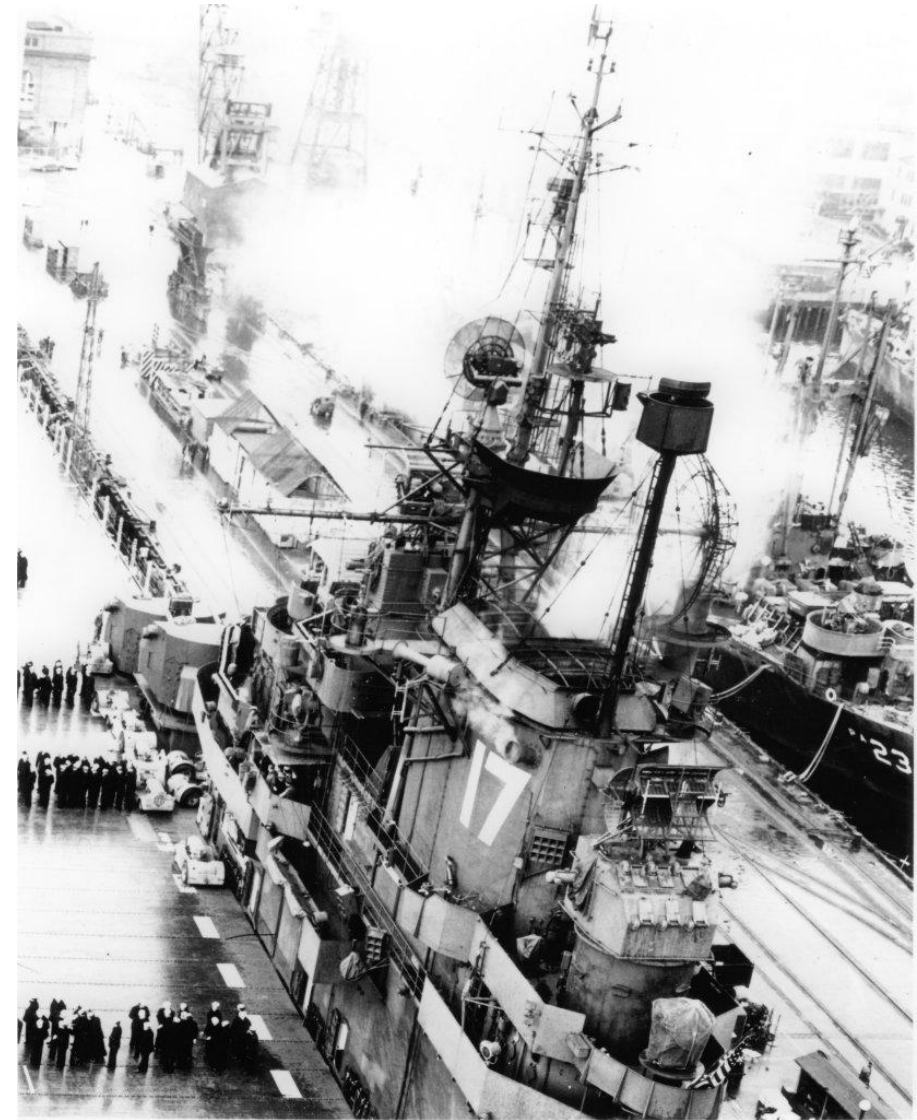
- By September 1943 there were sufficient Mark III IFF sets in the fleet to dispense with the Mark II equipment that operated on the same frequencies as the radars.
- IFF Mark III was the Allied Forces standard identification friend or foe (IFF) system from 1943. It was widely used by aircraft, ships, and submarines.
- The Mark III had its own assigned frequency, and its own antenna, which was usually mounted on top of the search radar antenna.
- The Mark II equipment had the same bearing discrimination as the search radar to which it was attached, however, the Mark III discrimination was not quite as sharp as the search radar.
- To make up for this, it could detect one of seven codes set up in an aircraft. For example, this would allow controlled fighters to be identified separately from other friendly aircraft.
- Photo: The IFF antenna is visible extending down under the cockpit of this Hawker Typhoon.



October 1943 – Air Defence

- The SCR-584 was so successful that it was adapted for use by the United States Navy for Fighter Direction use.
- CXBL, a prototype of the navy version, was mounted on the carrier USS Lexington in March 1943, while the production version, the SM, built by General Electric, was operational on the carriers USS Bunker Hill and USS Enterprise by October 1943.

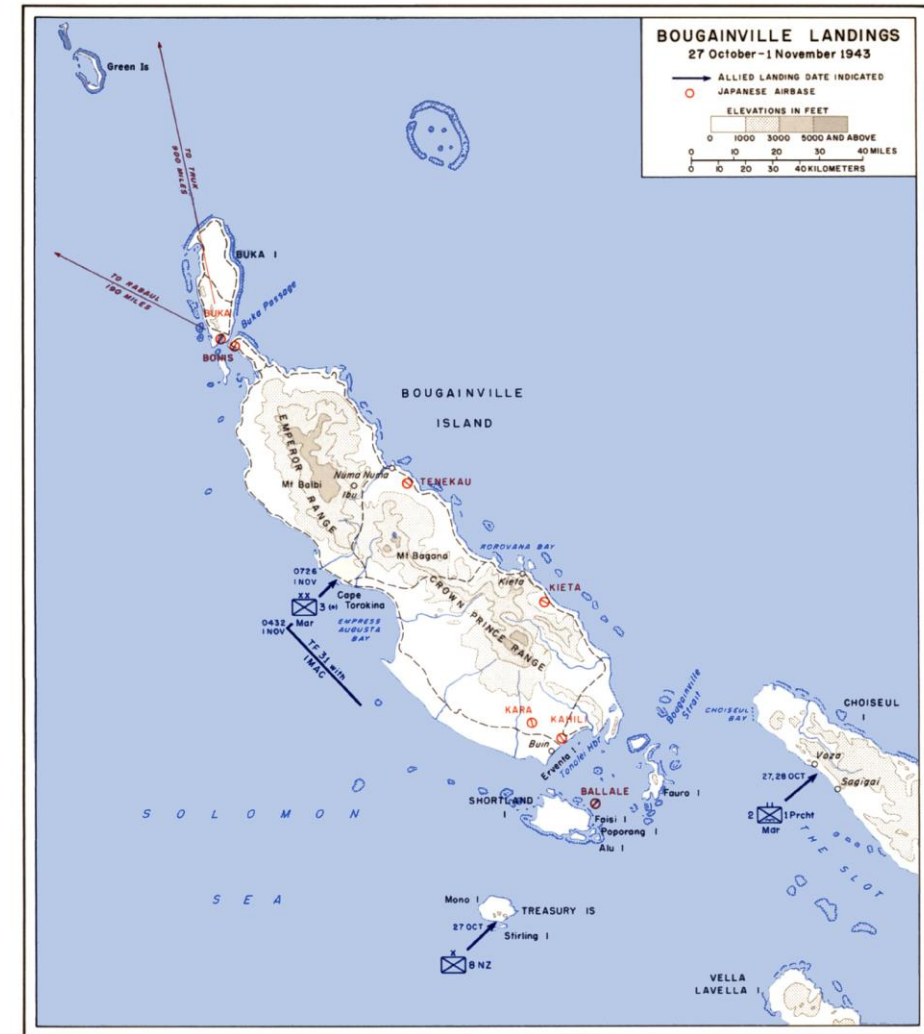
Wavelength	10 cm
Pulse Width	1 microsecond
Pulse Repetition Frequency	775-825 Hz
Power	600-700 kW
Range	50 nautical miles (90 km) (bomber) 25 nautical miles (50 km) (battleship)
Scan rate	2-6 rotations per minute in search mode 7.5 scans per second over a 60 degree sector in track mode
Scope	PPI with 10, 50, and 80 nautical mile (19, 90, and 150 km) distance scales
Accuracy	200 yards/0.5 degree/500 feet 180 meters/0.5 degrees/150 meters
Resolution	200 yards/3 degrees 180 meters/3 degrees
Production	First prototype installed on Lexington 3/43. First two production models on Bunker Hill 9/43 and Enterprise 10/43. A total of 23 were deployed through 1944-10.
Variants	The SM-1 was a lighter version. All 26 were given to the Royal Navy as Lend-Lease .



SM aboard USS Bunker Hill

November 1943 – Air Defence

- The destroyer Sauffley, in November 1943, had an embarked fighter direction team aboard to support the Bougainville landing. The commanding officer, in his action report noted that the team had experienced problems with his older SC radar:
- Because of the marked difference in the performance of the various types of search radars, it is recommended that Fighter Director units be assigned to ships with SC-2 radar.
- This recommendation is based on the fact that SC-2 radar is the only one having directional IFF, which permits quicker discrimination between friendly and enemy units.



November 1943 – Air Defence

- Sometimes there was friction between embarked FD teams and skippers.
- On destroyer Pringle (photo) supporting the Bougainville landing the FDO had twice requested the CO to use the ship's radio to request advance information regarding expected tactics and strength of the Japanese forces, plans of Allied surface and aviation forces, and specific information on the air squadrons with whom he would be working.
- Even though the ship was equipped with a new line of sight VHF radio, the skipper refused to break radio silence.
- The fighter director would not be permitted to transmit until he had a definite bogey on his radar. The FDO wrote in his action report.
- Much valuable time... is lost in checking with his cover, finding out their calls, their positions and their angels (altitude). The fighter director should have all this information at his fingertips prior to the appearance of the bogey so that an immediate vector for proper intercept can be given.



The U.S. Navy destroyer USS Pringle (DD-477) underway sometime in December 1942, location unknown. Note that she is fitted with a catapult and derrick, these were removed before her Pacific service. Note that the forward turrets have their top hatches open.

June 1944 – Air Defence

- The SCR-584's most dramatic success came against the V-1 flying bomb. Beginning in June 1944, Germany launched thousands of pilotless weapons against London.
- The SCR-584, combined with the proximity fuze achieved extraordinary results
- These electronic aids arrived in quantity from June 1944.
- Before this combination entered service, anti-aircraft guns destroyed fewer than one V-1 in four; afterward, they destroyed approximately 85 percent of targets engaged.

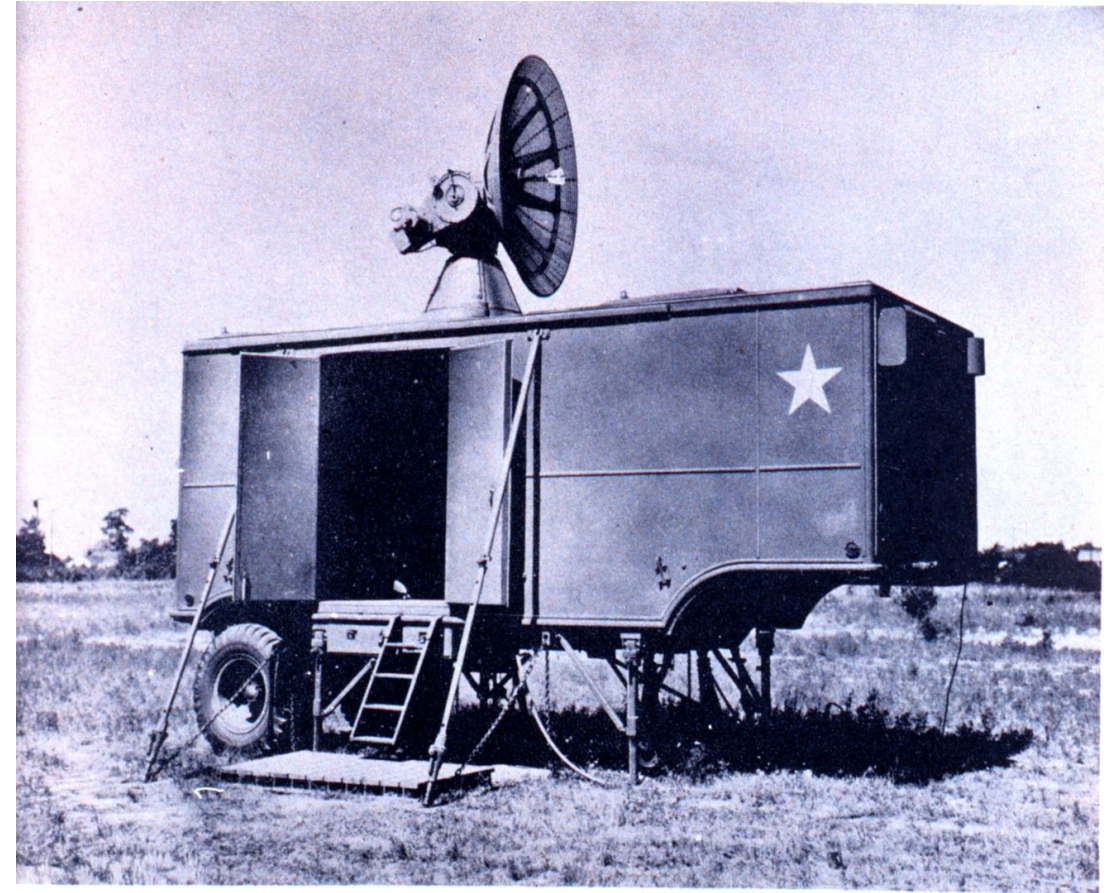


Figure 22. Exterior View of Radio Set SCR-584.

June 1944 – Air Defence

- V-1s were first launched against London on 13 June 1944, one week after (and prompted by) the Allied D Day landings in France.
- At times more than one hundred V-1s a day, each containing an 850Kg warhead, were land launched against south-east England, 9,521 in total, decreasing in number as launch sites were overrun until October 1944, when the last V-1 site in range of Britain was overrun by Allied forces.
- After which the campaign continued using air-launched missiles.
- Seventeen per cent of all flying bombs entering the coastal "gun belt" were destroyed by guns in their first week on the coast. This rose to 60 per cent by 23 August and 74 per cent in the last week of the month, when on one day 82 per cent were shot down.
- Photo: A battery of static QF 3.7-inch guns on railway-sleeper platforms at Hastings on the south coast of England, July 1944.



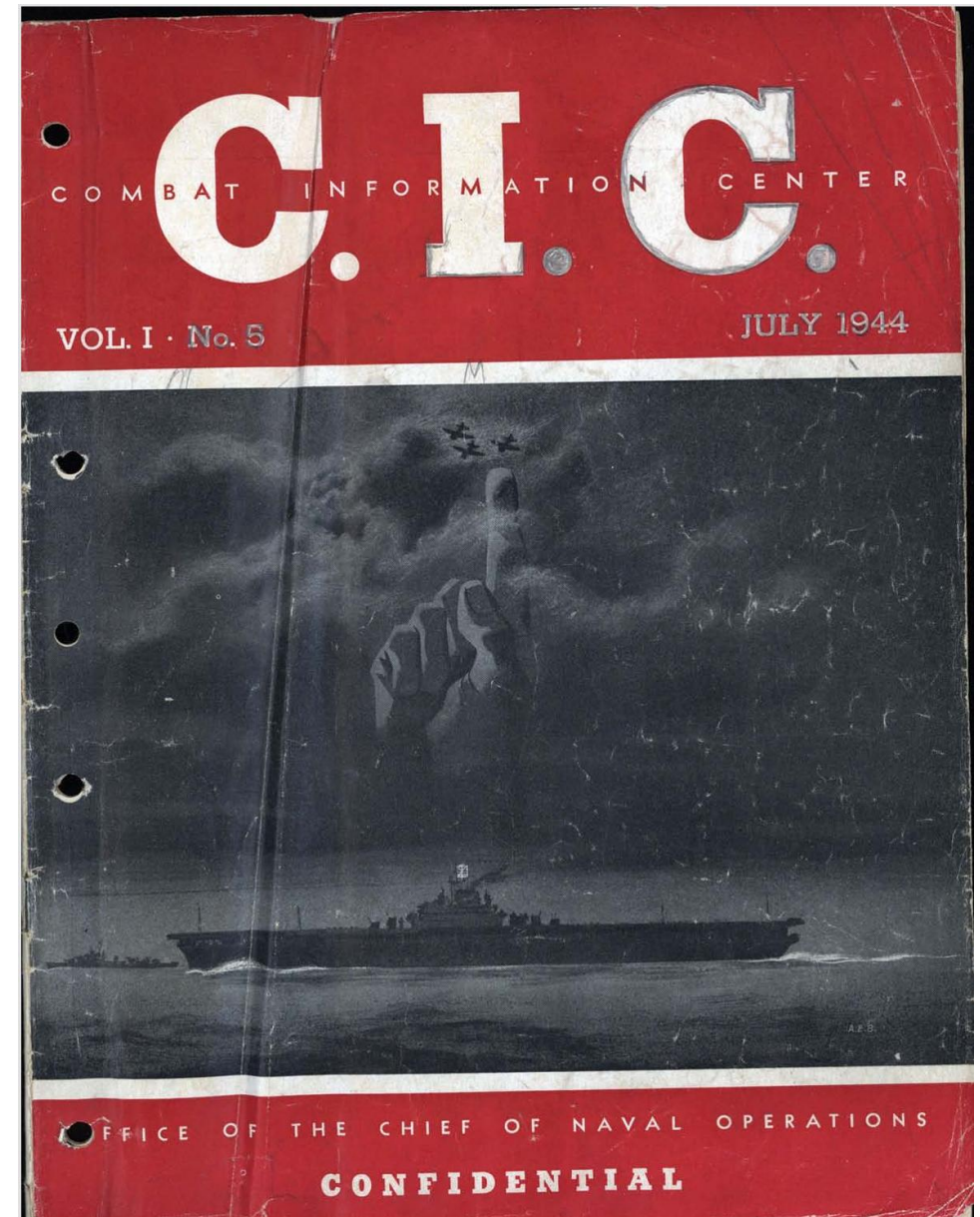
July 1944 – Air Defence

UNITED STATES FLEET
Headquarters of the Commander in Chief
Navy Department, Washington, D. C.

1 July 1944.

This magazine CIC is established as an aid to Command, CIC, Aviation and other interested personnel to present, monthly, a digest of the latest operational methods evolved, and lessons learned in combat, so their skill and ability may, at all times, equal the capabilities of the equipment which is available to them.

R. S. EDWARDS,
Chief of Staff.

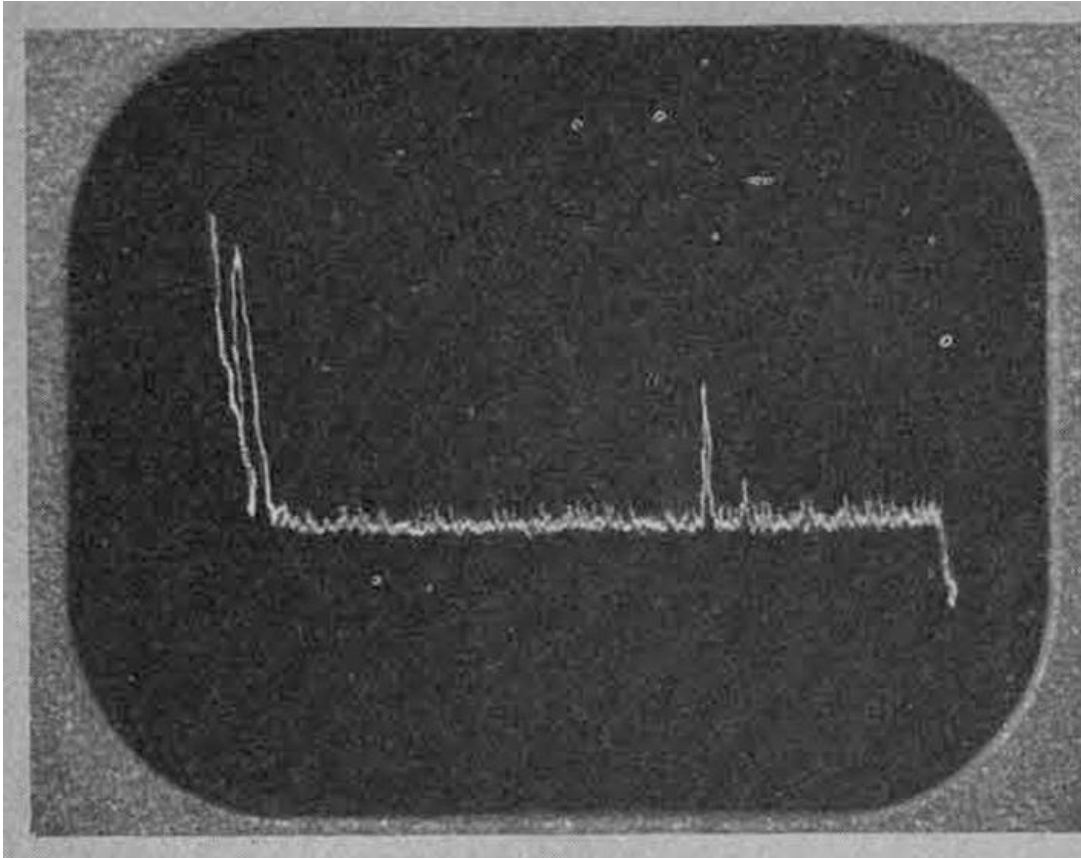


July 1944 – Air Defence



◀ Unidentified aircraft—*bogeys*—are detected by the long range search radar. The operator reports to the Combat Information Center, giving the bearing and range of the aircraft.

July 1944 – Air Defence



◀ When the planes are first detected on the radar scope it may be difficult to determine information other than bearing and range of the target. Subsequent reports will, when plotted and evaluated in Combat Information Center, show course and speed of the bogeys and the important information on altitude.

July 1944 – Air Defence



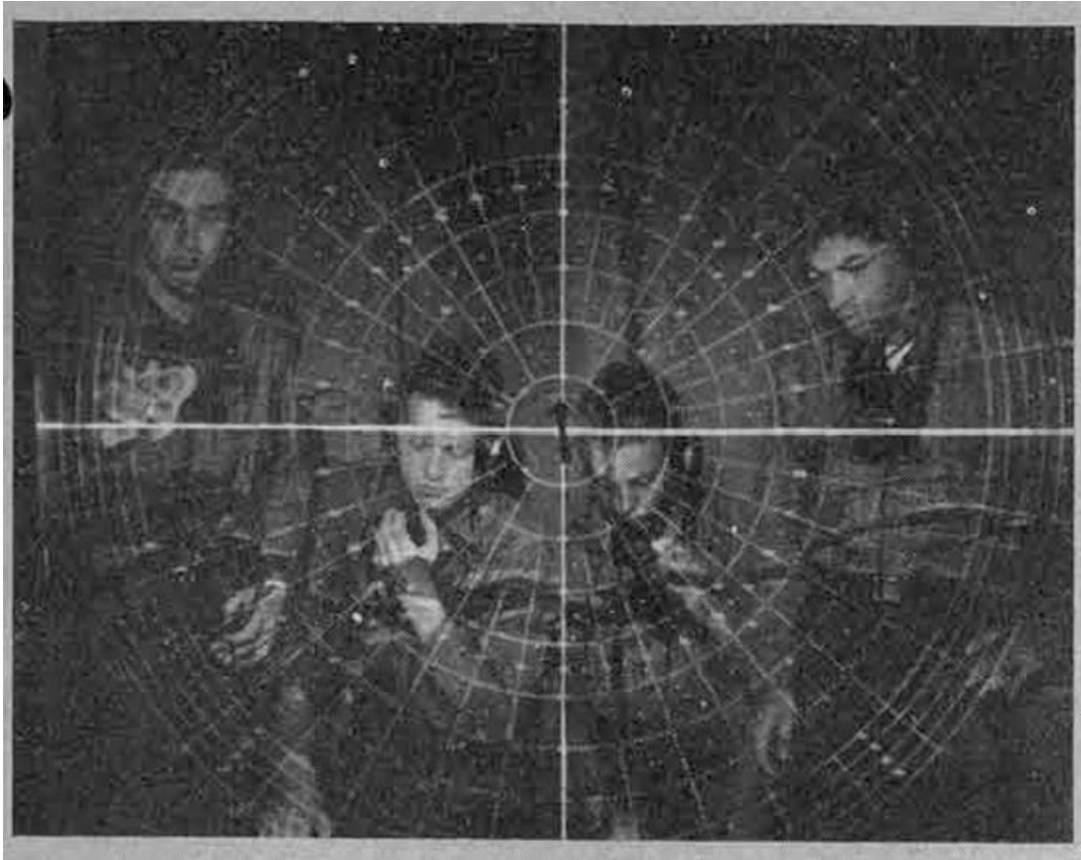
◀ The force fighter director designates the raid by number, gives instructions for the interception of the raid, and informs the task force commander of the action taken.

July 1944 – Air Defence



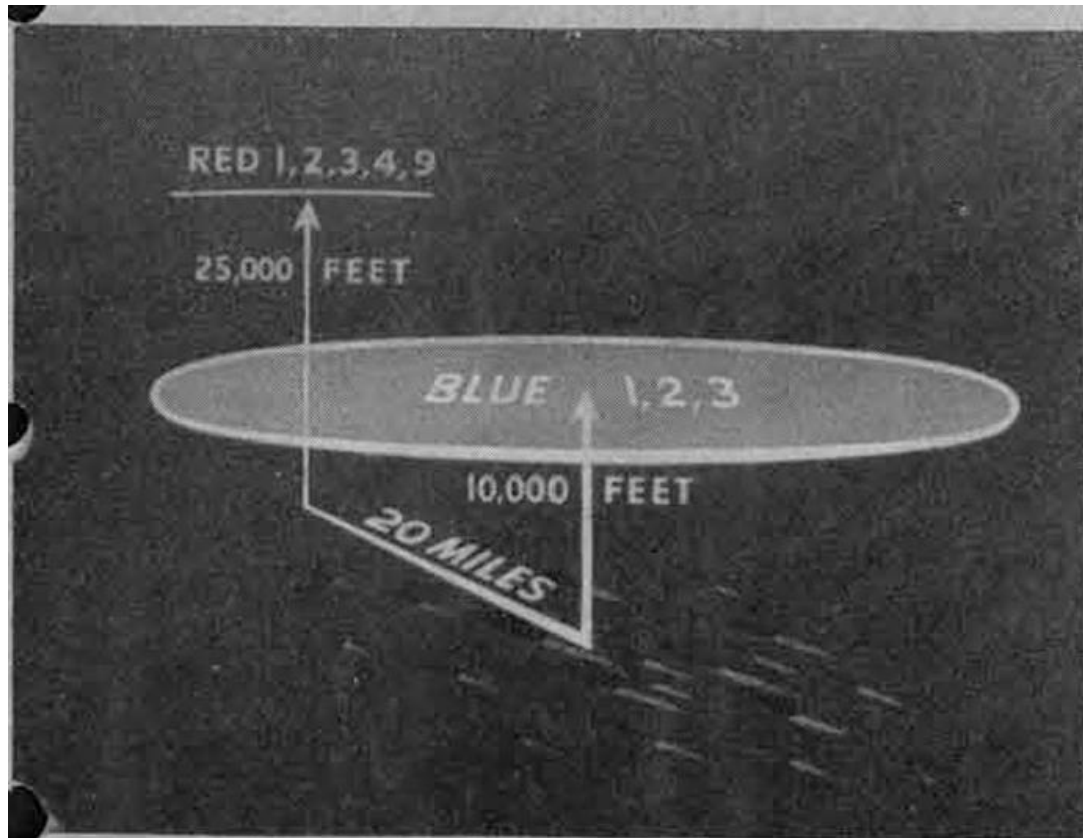
◀ The radio intercept operator furnishes valuable information to C. I. C. Such information—usually translations of the enemy's ship or aircraft radiotelephone conversations—may indicate, for example, that a "shadower" has seen our forces and reported our position to his base.

July 1944 – Air Defence



◀ When radar and air search information shows enemy air activity in great force, ship and aviation personnel are ordered to General Quarters. C.I.C. is then fully manned and ready to operate under battle conditions.

July 1944 – Air Defence



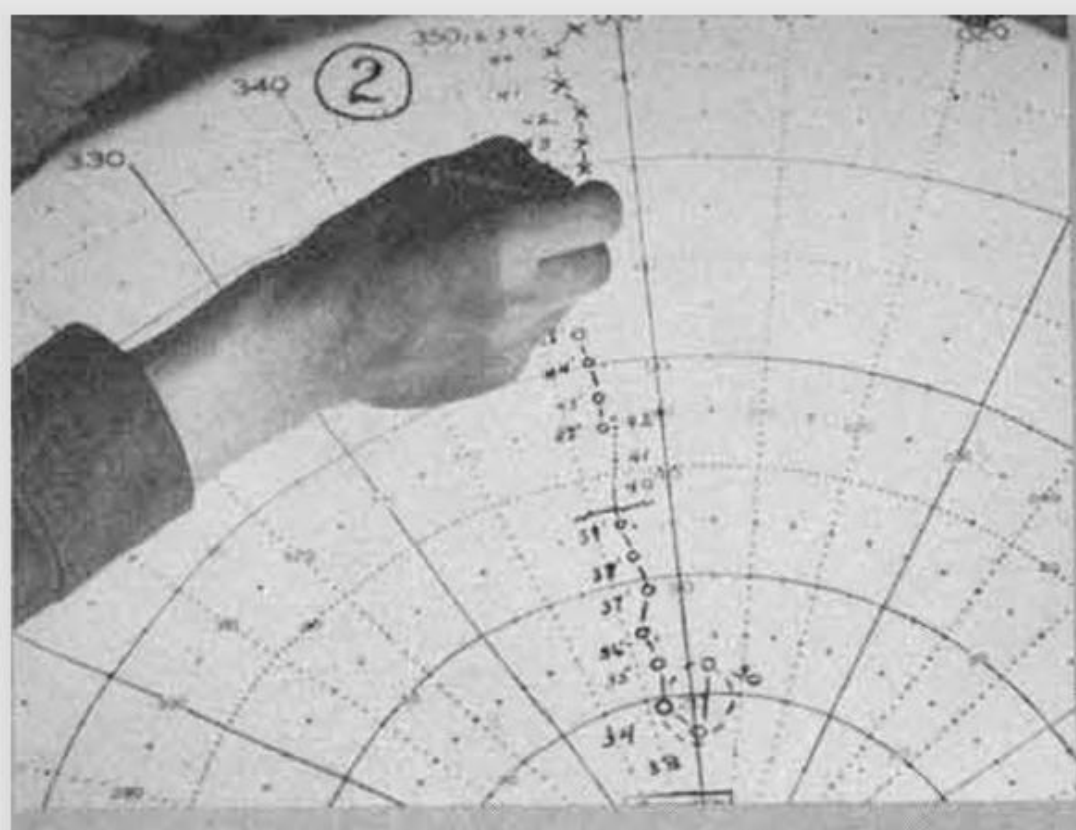
◀ The force fighter director orders the appropriate number of fighter aircraft to be scrambled and combat air patrols take station as directed, dependent upon the tactical situation. Some fighters will remain over the force, ready to intercept *bandits* which break through or sneak inside the twenty-mile circle.

July 1944 – Air Defence



◀ The officer in front of the vertical plot evaluates the radar plots visible to him through the board and marks the estimated position of the planes for a particular time. He is shown here marking the position of *friendlies* on their way out to intercept raid 3.

July 1944 – Air Defence



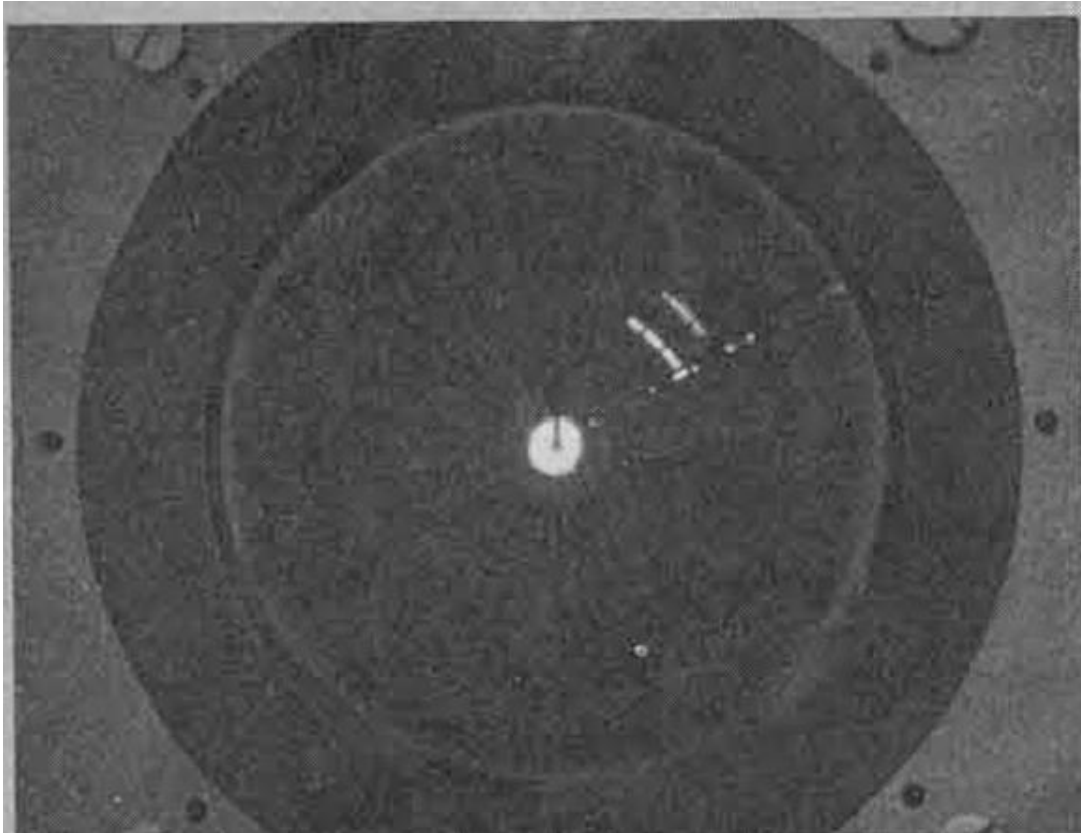
◀ The FDO has instructed the intercept officer to intercept raid 2. On the intercept board the position of the enemy and friendly planes is plotted continuously. The intercept officer endeavors, as the situation develops, to keep the fighters between the *bandits* and the task force.

July 1944 – Air Defence



◀ Beside the intercept board is a PPI unit on which is a radar picture of the situation. The intercept officer, as the interception progresses, refers to this indicator continually—sometimes exclusively, as the fighters overtake the *bandits*.

July 1944 – Air Defence



◀ Here is what the intercept officer sees when the fighters are close to the *bandits*. The bandits are shown as the outermost segment, the fighters slightly inside; the task force is at the center of the indicator. Notice that the VF are directly between the raid and *base*.

July 1944 – Air Defence



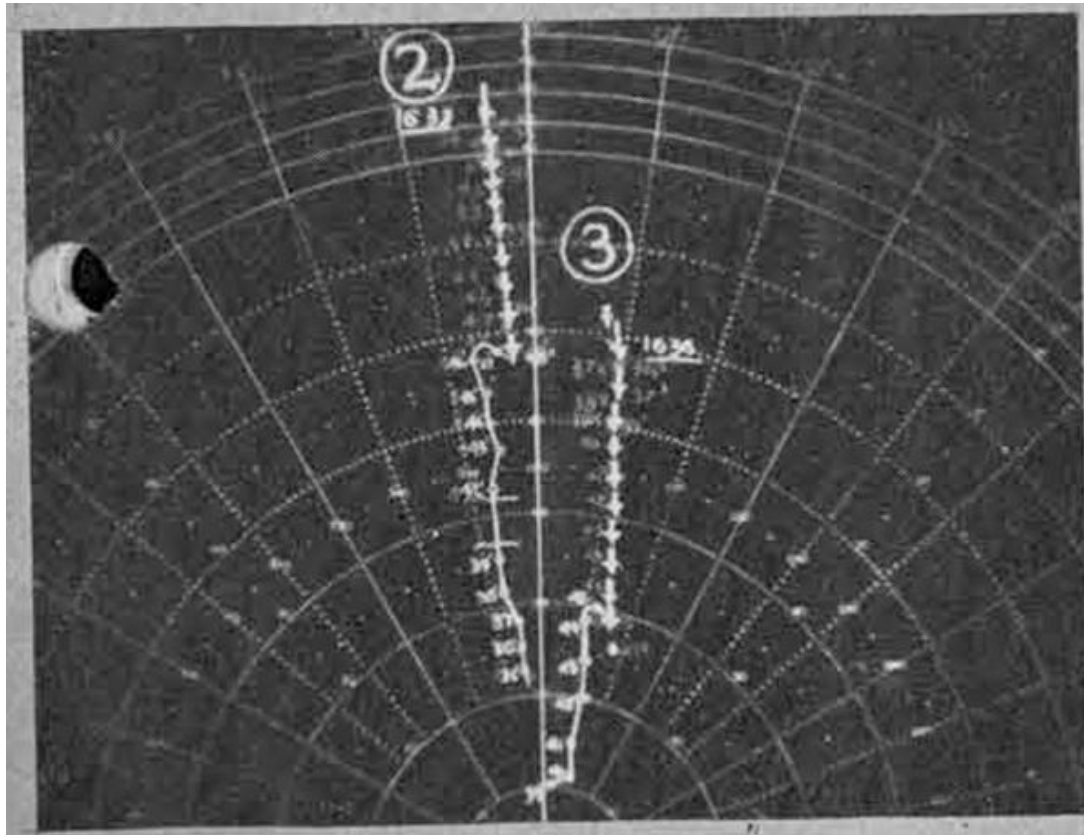
◀ As the fighters approach the enemy planes the intercept officer informs the pilot of the direction relative from the interceptor's course. In this case he would say, "Eleven thirty," and give the approximate distance. The fighters have been vectored to intercept above and in front of the incoming *bandits*.

July 1944 – Air Defence



◀ “Tallyho” from the pilot to base. The fighters have contacted, visually, the enemy aircraft. The fighters “have the ball” from here on in until the enemy planes are shot down or dispersed.

July 1944 – Air Defence



◀ This is how the vertical plot looks to the CIC personnel after two raids have been intercepted. The air battle is at a crescendo, and some of the enemy bombers or torpedo planes may break away and threaten another sector of the defensive ring around the task force.

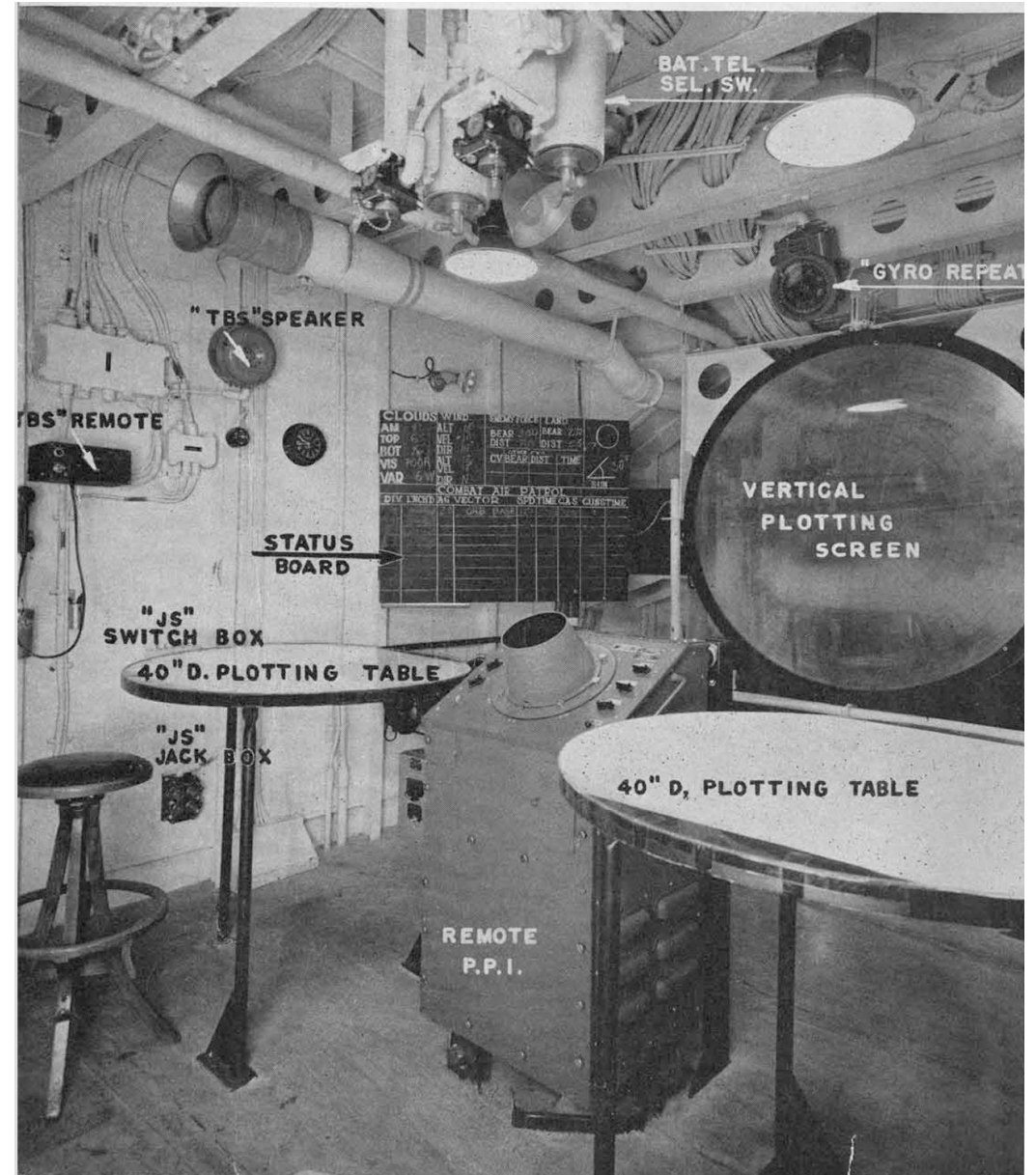
July 1944 – Air Defence



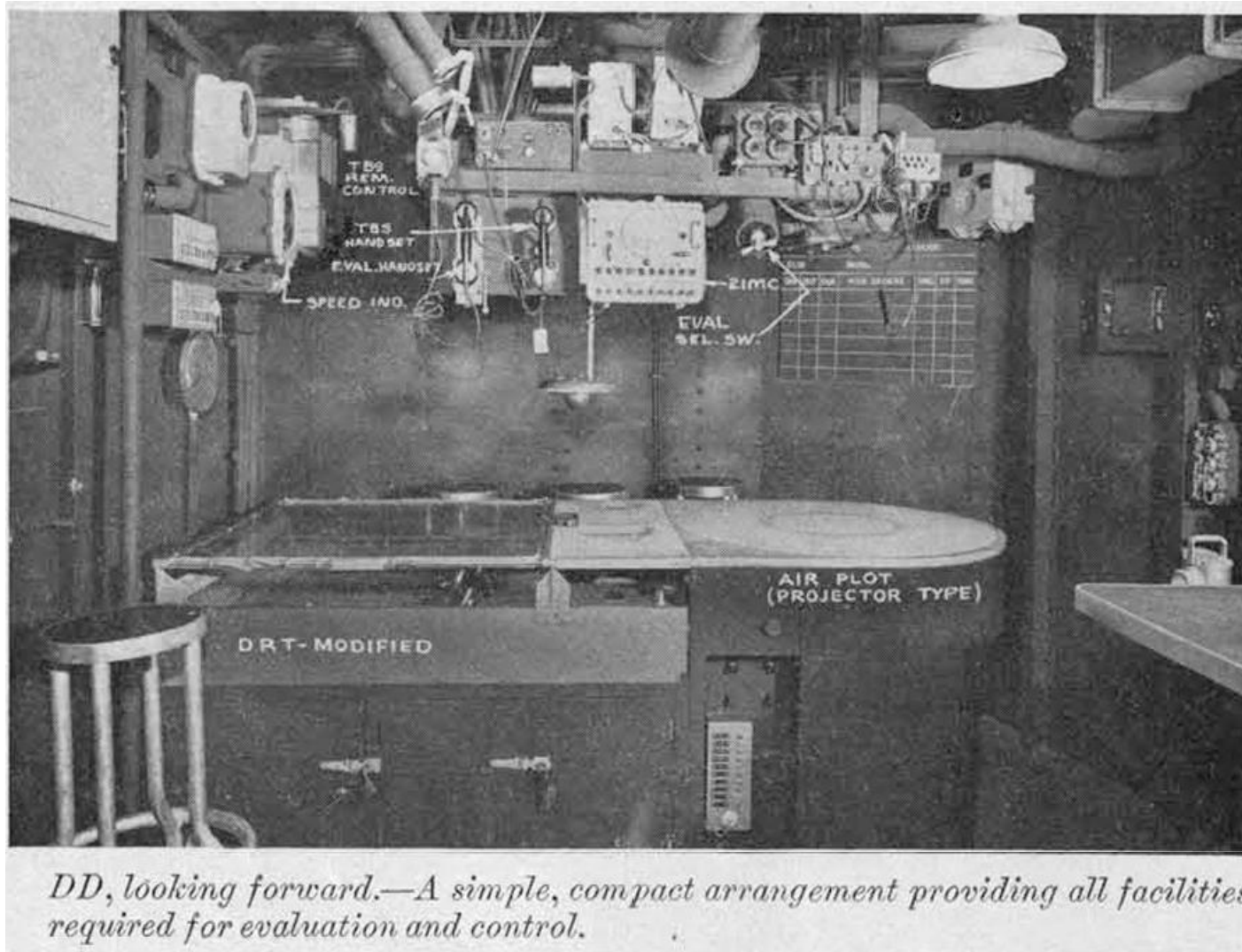
◀ If another raid develops as bombers break through the outer defenses, the FDO must vector some of the CAP immediately to put them *between the new raid and base*. Even with these measures some of the planes may get through to the ships.

July 1944 – Air Defence

CV, looking aft. Facilities for controlling Combat Air Patrols and numerous raids. Vertical Display Plot and Status Board tell the Fighter Director what the tactical situation is at all times.



July 1944 – Air Defence



DD, looking forward.—A simple, compact arrangement providing all facilities required for evaluation and control.

July 1944 – Air Defence

CA, with battle stations manned. Looming up in the left foreground, in front of the CIC watch officer, is a TDT (target designation transmitter) giving ranges and bearings to remote stations. Often, on Cruisers, the TDT is located beside the radars but here, interestingly, is stationed beside plot.



July 1944 – Air Defence



◀ The FDO instructs the visual intercept officer to prepare for interception of the incoming torpedo planes, and his antiaircraft liaison officer keeps Air Defense and the gun crews informed of the positions of the enemy planes.

◀ Topside the plot and information are kept up to date and the visual intercept officer is ready to direct planes of CAP to intercept the *bandits* on the outskirts of the formation. *These men would be wearing helmets at this stage of the battle.*

September 1944

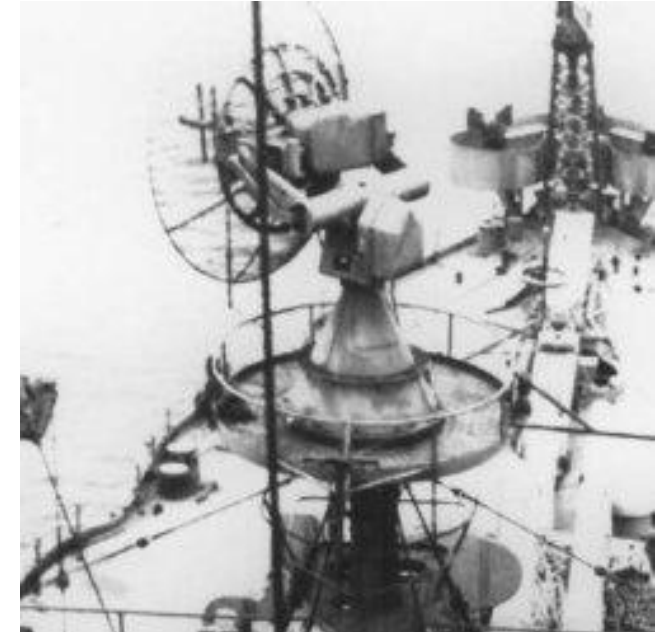
- In September 1944 the Office of the CNO issued an updated fighter director vocabulary having a special section with a visual FD vocabulary.
- It was even more terse than the standard vocabulary, with shortened phrases to support the quick reactions needed.
- To begin with, the ship's call sign was followed by the word "Snap." For example, "this is Ganymede Snap." This way, the pilots knew they were talking to a visual controller and should use the visual control vocabulary.
- Some examples of the vocabulary:
 - Vector Pronto - Dive as low as possible and go on the magnetic bearing given.
 - Steady - given after the controller has called for a port or starboard turn to tell the pilot to stop the turn. This works because the controller could see the aircraft's heading.
 - Up __ - Climb the number of feet given
 - Masthead - Fly just above the water.



September 1944

- A lighter version was also developed, the SCR-784. The only real difference was that the new design weighed 12,000 lb, whereas the original was 20,000.
- The lighter version was navalised for fighter direction as the SP which was installed on Fleet Carriers, Battleships, Cruisers and some Destroyers from September 1944.

SP Radar



Wavelength	10 cm
Pulse Width	1 or 5 microsecond
Pulse Repetition Frequency	120 or 600 Hz
Power	700-1000 kW
Range	35 nautical miles (65 km) on low-flying bomber 70 nautical miles (130 km) on bomber at altitude 40 nautical miles (70 km) on fighter 35 nautical miles (65 km) on battleship 25 nautical miles (45 km) on destroyer 15 nautical miles (30 km) on submarine
Antenna	Parabolic
Scope	PPI with 10, 50, and 80 nautical mile (19, 90, and 150 km) distance scales
Scan rate	6 rotations per minute
Accuracy	200 yards/1.5 degree 180 meters/1.5 degree
Resolution	200 yards/0.5 degrees 180 meters/0.5 degrees
Weight	9000 lbs 4100 kg
Production:	300 from 1944-9

21 October 1944 - Leyte

- At 6 a.m. Shropshire engaged a dive bomber which made a sudden appearance between her and Australia, lying a short distance away inshore of Shropshire.
- The aircraft dived at Shropshire but was apparently put off by the heavy barrage which that ship put up.
- It pulled out of its dive and flew very close off Shropshire's starboard quarter at a height of about 50 feet, and losing altitude. It came under fire from the after Bofors gun and observers in Shropshire claimed that the aircraft was hit, and that one of its wheels dipped in the water.
- It retired to the westward, but "it then turned east again and, although under heavy fire, passed up the port side of Australia and crashed into the foremast at 0605".
- Photo: HMAS Shropshire at action stations



21 October 1944 - Leyte

- Australia was thus the first Allied ship to be hit by a suicide aircraft.
- The American Naval Historian believes isolated instances of Japanese pilots crashing aircraft on ships when bombs missed or the aircraft was badly damaged had been observed since 1942, and the attack on Australia was in this category, and was not an organised Kamikaze attack.

21 October 1944 - Leyte

- Captain Nichols in Shropshire reported damage in Australia:
- There was a large explosion and an intense fire was started in the Air Defence position and bridge.
- Type 273 Radar Hut and lantern fell on to the compass platform, both H.A. Directors and D.C.T. were put out of action, and the port strut of the foremast was broken.
- The fire was brought under control very quickly and by 0635 the large quantity of wreckage on the compass platform and A.D.P. had been cleared away.
- Commodore J. A. Collins suffered burns and wounds; Captain E. F. V. Dechaineux and Commander J. F. Rayment were mortally wounded.
- Thirty officers and men were killed or died of wounds and 64 officers and men were wounded, 26 seriously.
- Australia retired to Manus and then to Espiritu Santo where she was repaired and was ready to sail to rejoin by 28 November.
- Photo: The bridge and forward superstructure of Australia in September 1944. This area was damaged when a Japanese bomber collided with the ship on 21 October 1944. Captain Emile Dechaineux (white uniform, facing right), was among those killed



25 October 1944 - Leyte

- Just after the Japanese battleships had broken off the action and turned away the fighter direction teams in the American flotilla were busy recovering aircraft with many friendly aircraft cluttering the skies around them.
- At 0740 a bomb laden Zero crashed into the light carrier Santee's flight deck, and the bomb exploded in the hangar deck, starting fires.
- In less than a minute, another Zero went into the water just short of the escort carrier Petrof Bay, and the small carrier Sangamon suffered a near miss by the bomb from another Zero that crashed into the ocean nearby.
- Sixteen men were killed on Santee, but after eleven minutes her damage control teams had the fires damped down.



A Yokosuka D4Y dive bomber, diving from the port side, misses with its bomb, which splashes to the starboard side of *Petrof Bay*, 25 October 1944, photographed onboard *Suwannee*.

25 October 1944 - Sea

- At 0800 another bombed up Zero made a hit in the middle of the light carrier Suwanee's flight deck, causing severe personnel casualties.



View of the attack of a Japanese A6M5 kamikaze suicide plane aboard the U.S. Navy escort carrier USS Suwannee (CVE-27) off the Philippines on 25 October 1944: the kamikaze's 250 kilogram bomb has just exploded between flight and hangar decks and fire billows out.

25 October 1944 - Sea

- However, the flight deck was repaired in two hours.



View of the flight deck of the U.S. Navy escort carrier USS Suwannee (CVE-27), 90 minutes after a Japanese suicide plane's bomb had ripped a hole in it. The hole is patched and the ship is ready to land aircraft. Note that only four wires, instead of eight, are being used. All landings were made without mishap.

25 October 1944 - Leyte

- At 1051 another Zero crashed into the escort carrier St. Lo's hangar deck causing ammunition magazines to explode and forcing abandonment. The ship sank thirty minutes after impact.
- After seeing five Japanese aircraft crashing in sequence into American aircraft carriers, there was no doubt that the Japanese had initiated a new brand of aerial warfare.
- MAGIC intercepts and prisoner interrogations had revealed Japanese contemplation of "jibaku" (self-immolation) tactics as early as 1943.
- Intelligence analysts dismissed these reports as isolated instances of individual fanaticism or psychological propaganda rather than indicators of an emerging doctrinal shift.
- The failure to recognize the formal establishment of the Special Attack Corps under Vice Admiral Takijiro Onishi reflected a cultural blind spot; American military thought could not comprehend the deliberate sacrifice of trained pilots and modern aircraft in one-way missions, viewing such tactics as militarily irrational and therefore impossible.
- Consequently, the first organized kamikaze attacks during the Battle of Leyte Gulf achieved complete tactical surprise, sinking the escort carrier St. Lo and damaging numerous other vessels.



A kamikaze strikes St. Lo

<https://www.youtube.com/watch?v=gl56oyDr0Eo>

26 October 1944 - Sea

- Kamikazes placed a much greater load on fighter directors.
- It was no longer enough to break up and disperse a raiding group, or to bring down most of a group, now the FDOs had to bring down every separate attacker.
- The challenge for the FDOs was made even worse on 28 October when a Kamikaze managed to sneak in and damage the light cruiser Denver while pretending to be part of a returning air strike.



The moment a kamikaze struck Suwannee on 26 October, the second strike on the ship in two days

7 December 1944

- One of my heroes of Pearl Harbor was William Outerbridge.
- That morning many others all over the Pacific and Far East were failing to recognise or react to the threat even after the bombs started exploding.
- Lt Cdr Outerbridge, two days after taking command of USS Ward, his first command, on a clear calm quiet winter Sunday morning in Hawaii saw a submarine, opened fire, sank it and transmitted a clear concise report to his command.
- These were the first shots of the war in the Pacific
- For his action at Pearl Harbour Outerbridge was awarded the Navy Cross.

CAPTAIN WILLIAM WOODWARD OUTERBRIDGE, USN,
Commanding Officer

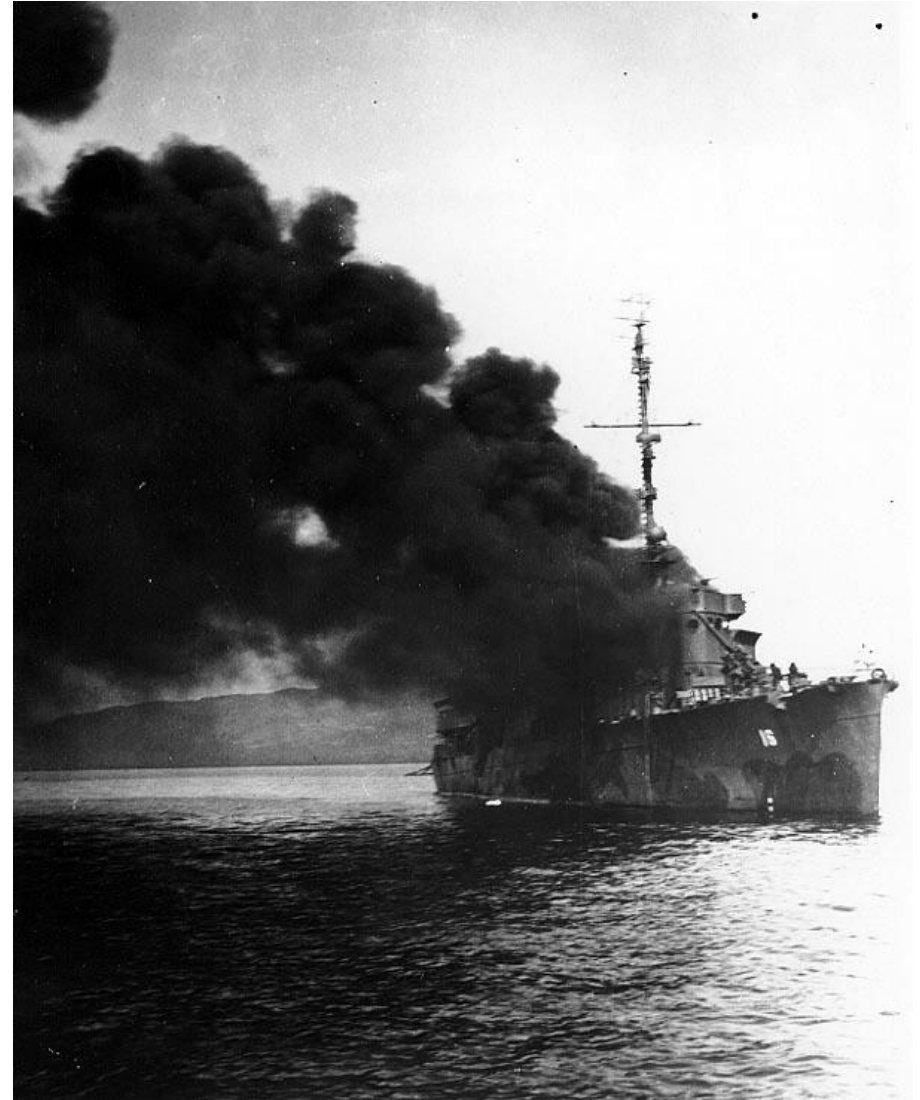


Post war photo.

7 December 1944

- In 1942, Ward was sent to the West Coast for conversion to a high-speed transport. In February 1943 she returned to the Pacific.
- After a posting ashore in Washington Outerbridge was given command of the destroyer O'Brien in June 1944.
- After action off the coast of Normandy on D Day Outerbridge and the O'Brien were reassigned to the Pacific Fleet to participate in the liberation of the Philippines.
- During 1944, Ward had taken part in amphibious landings on Saidor, Nissan Island, Emirau, Aitape, Biak, Cape Sansapor, and Morotai.
- In late 1944, she landed troops on Philippine beaches.
- In December while patrolling off Ormoc Bay, Leyte, Ward came under attack by several Japanese kamikazes. One bomber hit her hull amidships, bringing her to a dead stop.
- The resulting fires could not be controlled and Ward's crew was ordered to abandon ship.
- On December 7, 1944, three years to the day after their action at Pearl Harbor, Outerbridge, in O'Brien, was ordered to sink his old ship, the Ward.

Jerry McBrien 2026



Ward, after being hit by a kamikaze

11 December 1944 – Philippines

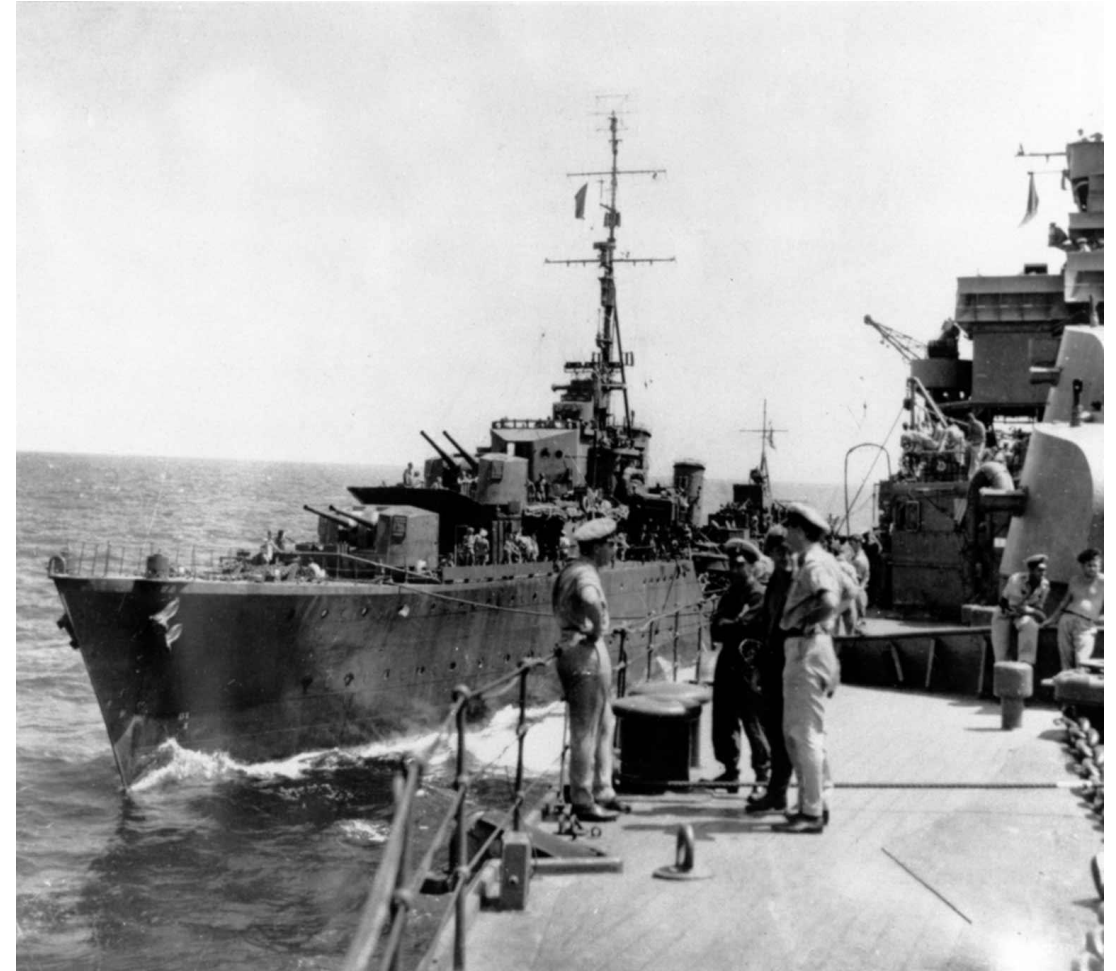
- USS Reid had been the fighter control ship during the landings at Lae and Finschafen.
- In two weeks in the waters around Leyte, Reid's crew was able to sleep only an hour or two at a time. They were called to battle stations an average of 10 times a day. It was a period of near constant combat.
- While escorting reinforcements for Ormoc Bay near Surigao Straits, Reid had destroyed seven Japanese planes.
- At about 1700, twelve enemy planes approached the convoy. Reid was the nearest ship to the oncoming planes.
- Planes 1 and 2 were shot down by the 5-inch battery, and Plane 3 exploded about 500 yards off the starboard beam. Plane 4 hooked a wing on the starboard rigging, crashing at the waterline. Its bomb exploded, causing considerable damage forward. Plane 5 strafed the starboard side and crashed on the port bow. Plane 6 strafed the bridge from the port side and crashed off the starboard bow. Plane 7 came in from astern, strafed Reid and crashed into the port quarter. Its bomb exploded in the after magazine, blowing the ship apart. All this action took less than a minute.
- The ship was mortally wounded but still doing 20 knots. As the stern opened up, she rolled violently, lay over on her starboard side and dove to the bottom. It was over in less than two minutes, 103 crewmen went down with the ship.
- The survivors were strafed in the water by Japanese planes before rescue.



USS Reid (DD-369) off the Mare Island Naval Shipyard, California (USA), on 11 July 1943. She was in overhaul at Mare Island from 27 May to 16 July 1943.

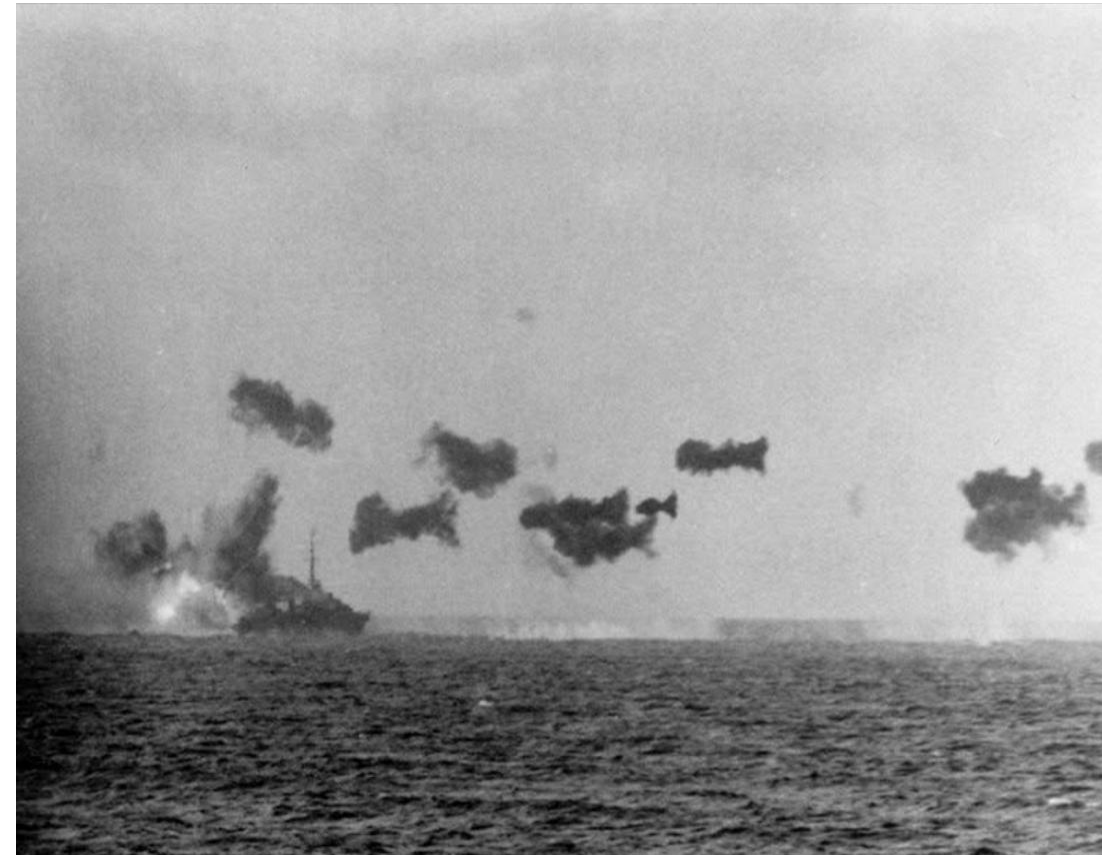
5 January 1945 – Subic Bay

- Commencing at 4.15 p.m., when about 90 miles west of Subic Bay, over a period of two and a half hours, between 50 and 60 aircraft made runs on TG.77.2 at altitudes varying from 20,000 feet to low over the water.
- Despite a strong Combat Air Patrol with as many as 58 fighters in the air at the one time, the Japanese Kamikazes were able to penetrate the defences.
- At 5.35 p.m. HMAS Arunta, on the screen of the leading group, sighted two Japanese aircraft on the port bow, heading straight towards her. Speed was increased to 25 knots and fire was opened with a barrage set to 3,000 yards.
- “One of the enemy planes veered to the right. The other headed straight for our bridge. The wheel was put hard a'starboard and, thanks to the extreme manoeuvring ability of the Tribal class destroyer, the plane missed by feet. It plunged into the sea alongside the Gear room on the port side. The plane, a Zero, carried a bomb, estimated to be 250 lbs. The subsequent explosion holed the ship's side in several places and severed the electrical leads to both steering motors. The ship continued to circle with the wheel hard a'starboard for about five minutes, as while enemy planes were still attacking I was anxious to keep moving.
- Arunta's casualties in this attack included two killed.
- Photo: The Australian destroyer “Arunta” alongside the heavy cruiser HMAS Shropshire during a cargo exchange. January 1945.



5 January 1945 – Subic Bay

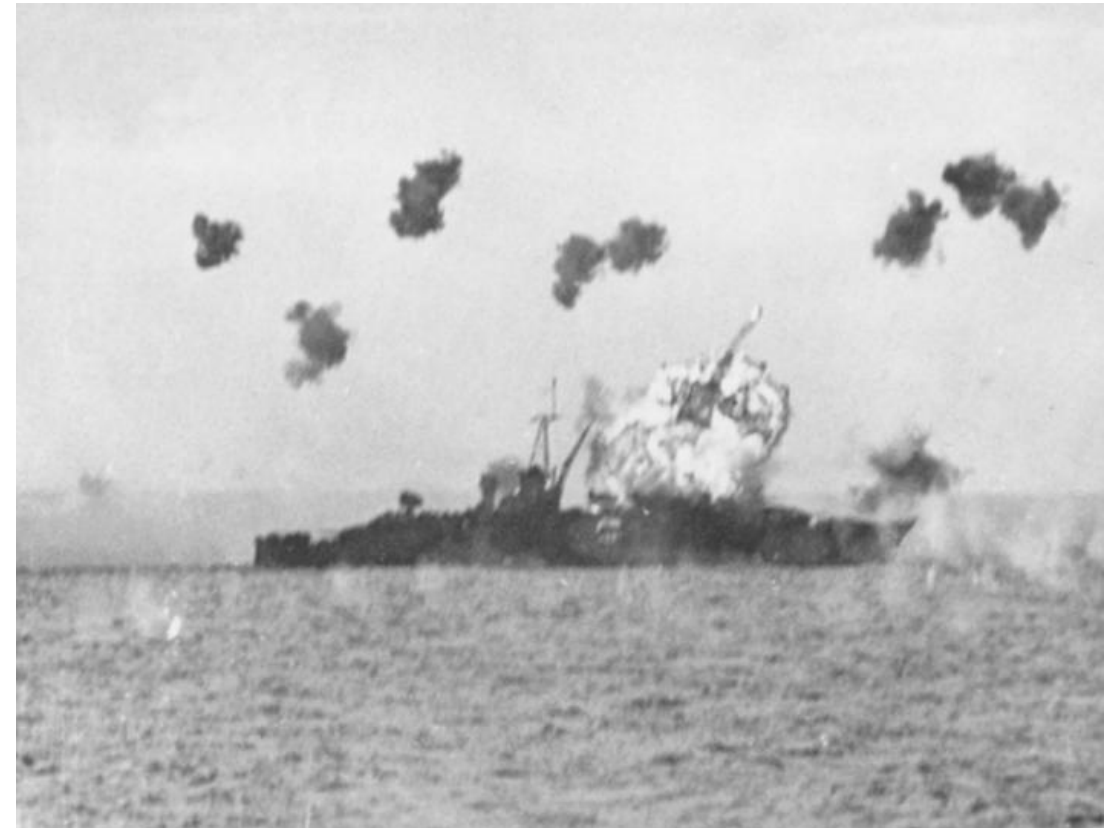
- The rear division was subject to a determined attack by at least six aircraft, which flew in low, just above the water, and were taken under fire by all ships.
- One was splashed abreast the destroyer screen and one altered course to pass astern. The remainder came in weaving low and fast despite intense anti-aircraft fire.
- They crossed ahead of HMAS Australia, two within a hundred yards.
- One went on to score a hit on the escort carrier Manila Bay.
- Another executed a very steep turn to the right, and ending in a vertical dive hit Australia on the port side of the upper deck amidships at 5.35.
- This plane carried a bomb which was responsible for a number of casualties.
- The resulting fire was quickly subdued.
- Material damage was slight, and guns put out of action were soon effective again.
- The major loss of fighting efficiency was due to casualties. There were 25 killed and 30 wounded mainly among gun crews and deck ammunition supply parties.



HMA Ships Australia and Arunta attacked by Kamikazes

5 January 1945 – Subic Bay

- At 5.42 Arunta had to stop to repair damage caused by the explosion.
- The American destroyer Ingraham stood by, circling slowly until repairs were completed at 10.55 p.m., when both ships proceeded at 25 knots for Lingayen Gulf.
- As Commander Buchanan remarked in Arunta's Action Report, "We were fortunate perhaps that darkness covered most of this period of involuntary immobility."
- Five American ships were damaged in TG.77.2 that day. Louisville and destroyer escort Stafford seriously damaged; escort carrier Manila Bay, moderate damage; and escort carrier Savo Island and destroyer Helm, minor damage. The American ships suffered 99 casualties.



USS Louisville hit by a kamikaze (Mitsubishi Ki-51) in Lingayen Gulf, January 1945

6 January 1945 – Lingayen Gulf

- Throughout the day there were sporadic air attacks, mainly by suicide aircraft, and a number of ships were damaged.
- New Mexico was in column ahead of Shropshire when, at 12.3 p.m., she was hit by a suicide aircraft. It seemed to observers in Shropshire that the aircraft was diving on Australia, who was astern of Shropshire. But it increased height, passed down Shropshire's starboard side at mast head height, and crashed into the port side of New Mexico's bridge.
- Shropshire scored several hits on this aircraft and shot away its tail as it passed.
- Eight minutes later Shropshire was near missed on the starboard side abreast the bridge by an aircraft "which dived from the sun."
- It was hit by A .A. fire and, narrowly missing the top of B' turret, crashed into the sea alongside the bridge."
- A few minutes after this, at 12.19 p.m., two fast, low-flying aircraft— "obviously suiciders"—appeared out of a gap in the hills to the westward.
- The nearer one was taken under fire by HMAS Warramunga, crossed the destroyer's bow at about 800 yards, and crashed into the American destroyer-transport Brooks, which was lying stopped half a mile away.
- Warramunga closed with Brooks, evacuated its wounded, assisted in suppressing two fires and then towed Brooks out to a safe anchorage.



Warramunga in 1944, a Tribal class destroyer, one of three built in Australia.

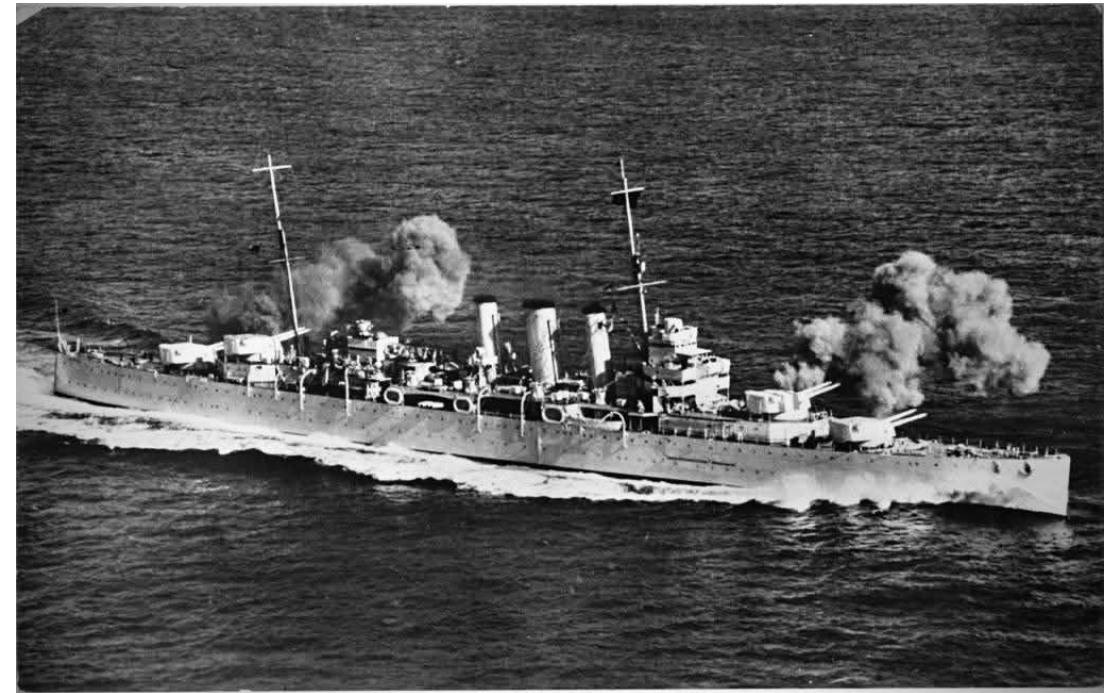
6 January 1945 – Lingayen Gulf

- At 5.34 p.m. Australia was astern of Shropshire, and Midshipman Francis in that ship recorded how
- "the plane, a Navy type dive-bomber, came in with one wheel down on our starboard quarter.
- In my opinion this plane was coming for us, but after flying through a Bofors and eight-inch barrage he turned away in favour of crashing into Australia amidships."
- Australia recorded how At 5.34 a "Val" dived on the ship from the starboard quarter, and flattening out, hit the ship on the upper deck between S.2 and S.1.
- This plane also carried a bomb which, from fragments found, appeared to have been converted from a large calibre shell.
- The resulting fire was quickly subdued, though "A" boiler room had to be shut down temporarily.
- Material damage affecting the fighting efficiency was confined mainly to S.2 mounting. Both guns were put out of action and all form of control destroyed. . . .
- Again the major damage to fighting efficiency was through casualties. There were 14 killed and 26 wounded. (The whole of S.2 gun's crew and most of S.1.)
- Subsequently, except for a special bombardment firing, there were only sufficient crews to man one 4-inch mounting each side, a large proportion being casualty replacements).
- Photo: HMAS AUSTRALIA, AT SEA. 1943-02. A 4 INCH QF MARK XVI TWIN ANTI AIRCRAFT GUN ON 4 INCH TWIN MARK XIX MOUNTING OF HMAS AUSTRALIA



8 January 1945 – Lingayen Gulf

- On 8th January Australia was last in line of the Bombardment Force as it moved into the Gulf after having stood off shore during the night.
- At 7.20 a.m. a Japanese two-engined plane was sighted coming in low on the port quarter.
- Australia opened fire and at the same time four patrolling "Wild Cats" attacked.
- The enemy plane was splashed twenty yards from the ship and skidded into the ship's side doing little damage.
- At 7.39 a second aircraft attacked from the same quarter and was put down just short of the ship but hit the ship on the waterline below the bridge.
- It carried a bomb which exploded short of or against the ship's side and blew a hole 14 feet by eight feet, opening a provision room and one oil tank to the sea and flooding bilges.
- The ship took a list of five degrees to port and adjacent compartments commenced to flood slowly. The list was corrected and flooding brought under control, and shoring up of bulkheads carried out.
- Fortunately the casualties in these two attacks were minor in character, "mostly shock".
- Referring to the second attack, Australia's report said that the fact of the light casualties "was remarkable, since a lot of shrapnel, one engine and a propeller came inboard and landed in various parts of the ship".
- Despite her damage, Australia met her scheduled bombardment engagements, though the blast effect of firing her forward 8-inch guns on the port side was straining the inner bulkheads, so that it was decided not to fire them on that side except in an emergency.



HMAS Australia conducts firing practice with her BL 8-inch Mi VIII guns in the late 1930's

9 January 1945 – Lingayen Gulf

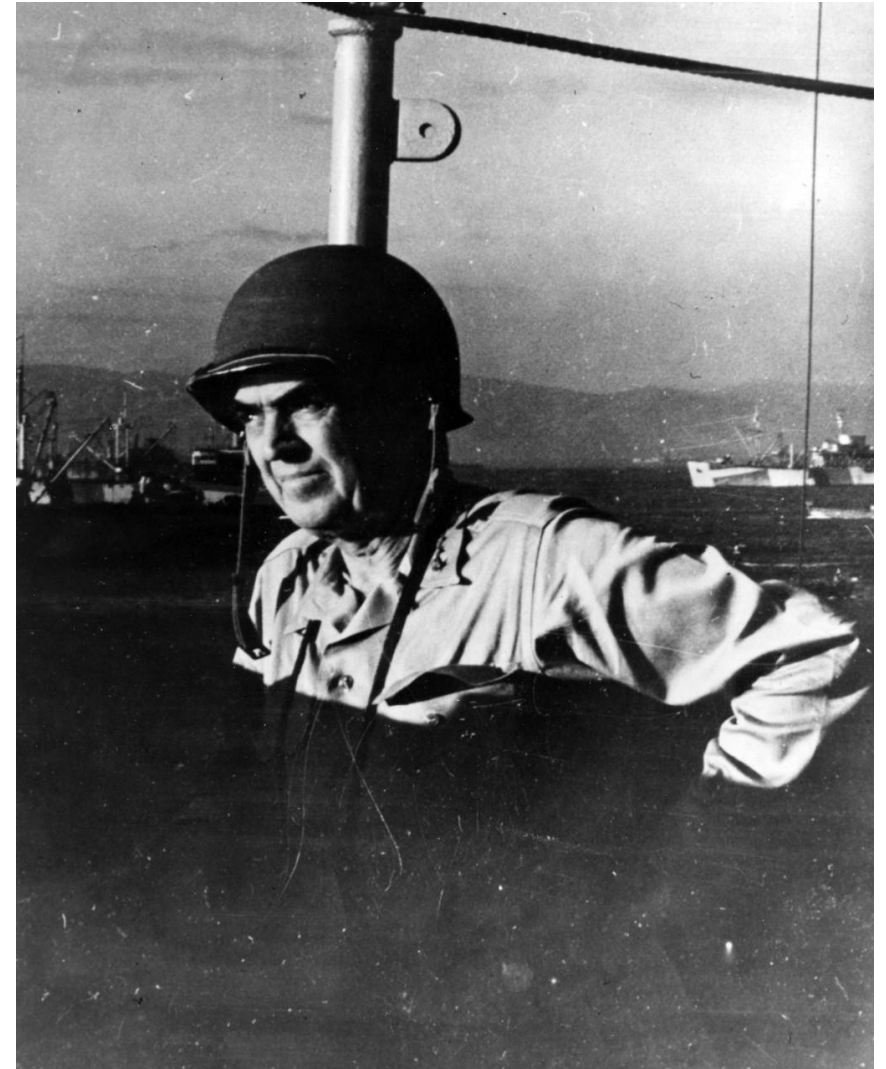
- Australia had completed her scheduled bombardments by 10.30 a.m. and, since no targets of opportunity arose had not again fired.
- At 1.11 p.m. two aircraft were sighted coming in from the east.
- One dived past Australia and hit U.S.S. Mississippi near the bridge.
- The other came in ahead of Australia after a curving dive and tried to hit the cruiser's bridge and fore controls.
- He missed his aim, however, and diving under the foreyard his wing tip caught on a mast strut which swung him into the foremost funnel and over the side.
- There was no other material damage than cutting off the top third of the funnel, which necessitated closing down two boilers in "A" boiler room, and damage to radar and WT aerials, which was quickly repaired.
- There were no casualties.
- A hole was cut in the damaged funnel by next day and all boilers were again in action



Australia in January 1945 showing accumulated damage from kamikaze attacks

January 1945 - Philippines

- In January 1945, the Japanese again began mounting serious dusk attacks on the fast carrier task force at Linguyan Gulf in the Philippines. Commander Seventh Fleet noted:
- ...thirty percent of the damaging suicide attacks occurred between the hours of 1700 and 1800....Sunset for this period was at 1740. This shows the Jap's preference for attacking a half hour before sunset when he can use the sun's glare to cover up his approach, and when our combat air patrol is being recovered.
- If the fighter direction ships had been equipped with SM or SP height finding radar they might have been able to detect the incoming low fliers, but such was not the case.
- The night fighters seemed to be more effective against individual snoopers than against large attacks.
- Photo: Admiral Kinkaid, Commander Seventh Fleet, watches landing operations in Lingayen Gulf, Leyte, from the bridge of his flagship, USS Wasatch (AGC-9), circa 9 January 1945.



21 February 1945 - Japan

- From February 1945 Task Force 58 ranged along the Japanese homeland coast attacking airfields to reduce the air power that could oppose an invasion force.
- Land based air was reduced but at some cost.
- On 21 February at 18:45 seven Japanese aircraft attacked; after five near-misses on the Lunga Point two planes crashed into the Casablanca class escort carrier Bismarck Sea, crippling firefighting and triggering major fires and explosions.
- Captain Pratt ordered abandon ship at 19:05; the carrier sank at 21:15 with 318 lost.



Bismarck Sea exploding after being hit by a kamikaze, photographed from USS Saginaw Bay

21 March 1945

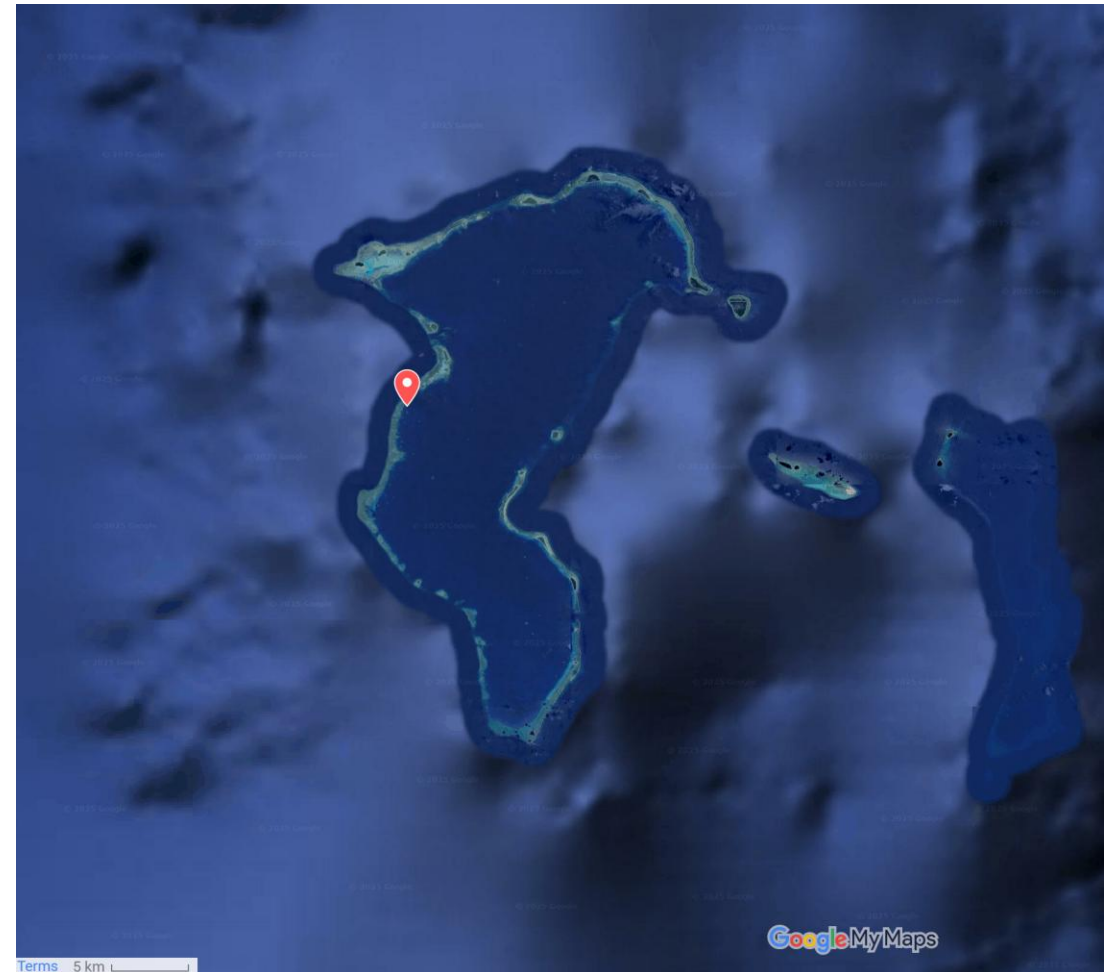
- On 21 March in an American carrier task group 320 miles at sea from Kyushu at noon a single large raid showed up at over 100 miles on the cruiser Vincennes' radar.
- Vincennes' FDO notified Task Group 58.1 fighter director LT Charles Ridgway who immediately vectored airborne CAP to check out the raid, launched backup TG 58.1 fighters, and called on the other three task groups to launch fighters in support.
- As a result there were 150 Corsairs and Hellcats vectored out to meet the raid. Corsairs from the fleet carrier Bennington took on the fighter protection, shot down twenty Zeros, and prevented the rest from engaging twenty-four Hornet and Belleau Wood Hellcats that attacked G4Ms.
- Intercept was fifty miles out from the main body, and all eighteen bombers were shot down at a cost of two USN fighters.
- Thus, it was found that the best defense against the cherry blossom was destruction of their mother planes before they got to launch point.



A replica of the Yokosuka MXY7 Ohka Model 11. Ōka; "cherry blossom"; is a purpose-built, rocket-powered human-guided kamikaze attack aircraft. The only variant to see combat, was the Model 11; armed with a 1,200-kilogram warhead and powered by three Type 4 Model 1 Mark 20 solid-fuel rocket motors. Starting on 21 March 1945, the Ohka flew combat missions. Although extremely fast, the Ohka had a very short range of 37 km and had to be carried into action by a much larger bomber that frequently proved to be vulnerable to carrier-borne fighters.

March 1945 - Logistics

- “During the 10 days that we spent at Ulithi, I had an experience that demonstrated the degree of fine-tuning the Navy had achieved by then.
- Facing the Okinawa operation, our ship's automatic weapons complement suffered a serious breakdown. The failure of a small fibre gear, probably no more than six inches in diameter, rendered a 40mm-quad mount inoperative.
- In all of our millions of rounds of firing at the AATCs I had never seen this breakage before, nor indeed any failure at all in the servo system that linked our mounts to the Mark 51 directors.
- With the stripped gear in hand, I headed for the barges of Service Squadron 10, with little hope of finding this obscure part. But I need not have worried.
- At SERVRON 10, in one of those delightful encounters with an old friend, I met one of our Bermuda supply officers who had taken the three-day course at Southlands. He soon produced the necessary gear and even gave me a spare.”
- Lieutenant Bob Wallace, USS Idaho.



Ulithi Atoll

March 1945 - Okinawa

- “With the certainty of an extended large-scale presence at Okinawa, the Navy needed a secure base for refueling, ammunition replenishment, and repair of damaged ships, instead of having to do these tasks in the open ocean.
- Through the foresight of Vice Admiral Richmond Kelly Turner, our amphibious commander who disregarded much counsel against it, we seized the Kerama Retto, a tight group of islands only 15 miles to the west.
- Before the attack began on Okinawa itself, we occupied this group in a largely bloodless operation.
- The main roadstead was capable of holding 75 large ships, with both entrances closed by steel nets. The kamikazes made a few small, partially successful attacks on Kerama Retto, but basically it was a tough place to approach, with its excellently sited radar and anti-aircraft guns on the surrounding hills.
- Through the long Okinawa campaign, we retired to the anchorage for bullets, fuel, repairs, and mail.”
- Lieutenant Bob Wallace, USS Idaho.



27 March 1945 - Okinawa

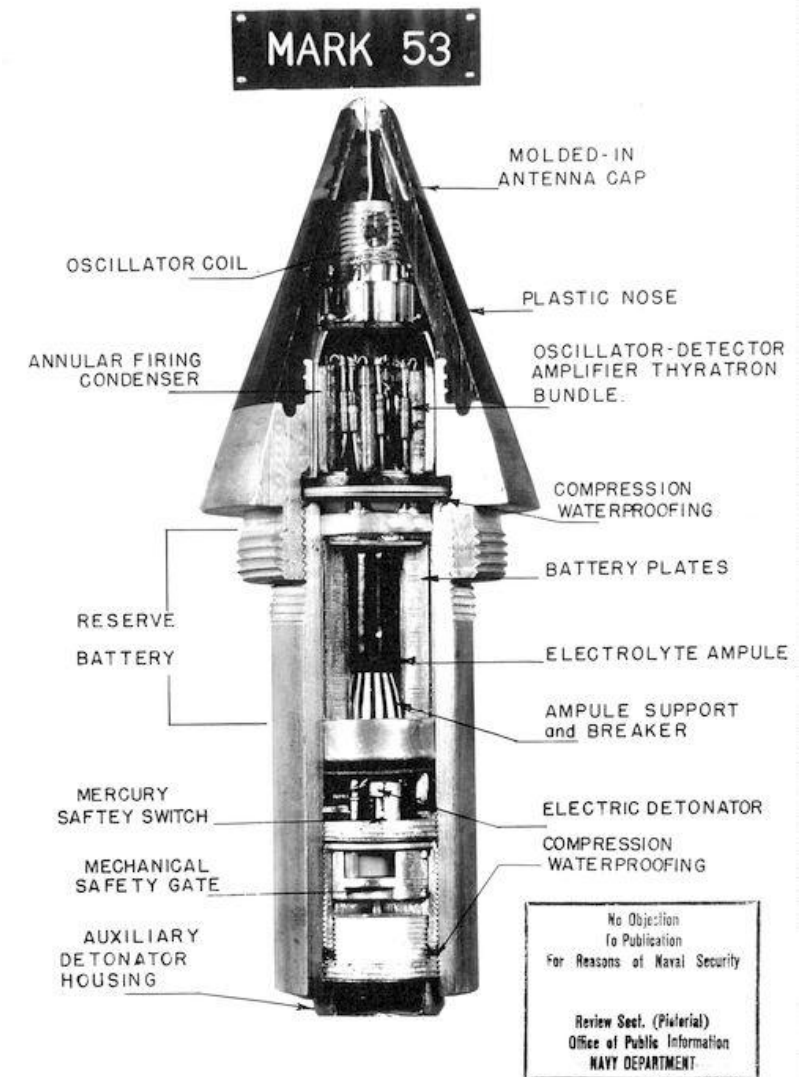
- “After our arrival at Okinawa on 26 March, we did not have long to wait for antiaircraft action of our own.
- The next morning enemy aircraft were reported an hour before any reached our (Idaho’s) vicinity.
- Then at 0620, shortly before sunrise, a twin-engine "Frances" made the mistake of flying past Idaho after dropping a bomb that did not score.
- At a range of 5,800 yards, our 5-inch turrets opened fire. It was about as auspicious an introduction as anyone could have hoped for.
- With five guns firing together, the plane burst into flames almost immediately. I would guess that she was destroyed by the very first salvo. But other salvos were already on their way when the hit was observed, and it took a bit of time for the guns to get the cease-firing order.
- The entire firing lasted but 15 seconds with a total of 20 rounds expended—only one a VT.
- The performance was perfect, and if the VT exploded, it was not needed. The aircraft was smothered by the shells bursting around it.”
- Lieutenant Bob Wallace, USS Idaho.



Lieutenant Bob Wallace, automatic weapons officer and Division Officer of the 8th Division, USS Idaho.

27 March 1945 – Air Defence

- In firing at aircraft, a 5-inch 38-caliber gun did not fire all VT fuses but instead mixed them in with ordinary anti-aircraft common (AAC) on which the fuses were preset at the guns.
- These shells would all explode, thus performing more or less as tracers.
- By observing the bursts of the preset fuses the director operator could tell where his shells were going relative to the target.
- Wherever the bursts were moving, he knew that his deadly VT fuses were among them and he could make appropriate corrections, somewhat in the manner of "spotting" surface fire.
- Lieutenant Bob Wallace, USS Idaho.



Proximity fuze MK53 removed from shell. Circa 1950s.

1 April 1945 - Okinawa



Tennessee (BB-43) bombards Okinawa on 1 April 1945 with her 14"/50 main battery guns, as LVTs in the foreground carry troops toward the invasion beaches

6 April 1945- Kamikazes

- “By far the heaviest kamikaze raid of the war came on 6 April, when the Japanese sent out 355 suicide planes.
- Most of these were shot down by Combat Air Patrol (CAP) fighters sent out to intercept the raids when they were located by radar picket ships stationed well out from Okinawa in order to afford early warning.
- Although many enemy aircraft were reported during the day, our big activity did not come until near the end of the day when we were already beginning our night retirement. Then shortly after 1800 the action came fast.
- Newcomb(DD 586) had already been hit by two kamikazes when our 5-inch guns commenced firing at another plane headed in her direction. Here we used VT fuses prodigally, expending 25 along with only 10 AAC.
- According to Idaho's action report, "This plane burst into flames, skidded in [the] water, and crashed into [the] destroyer already crippled by two previous planes.”
- Newcomb lay dead in the water as Leutze (DD 481) gallantly pulled alongside to render assistance. In what seemed like no time at all, still another plane appeared out of nowhere and headed for the two destroyers.
- We stood powerless to intervene, our hearts in our mouths, as we watched it crash into its two motionless targets. We could not fire without hitting the ships. As we moved ahead with the ships of our formation, the two destroyers fell behind and out of sight.”
- Lieutenant Bob Wallace, USS Idaho.
- This photograph taken at Kerama Retto on 9 April 1945 shows the damage caused by kamikaze hits on Newcomb (DD 586).



6 April 1945 - Air Defence

- The Inter-Fighter Director (IFD) radio network, which was turned on at all times, gave us complete information on the progress of attacks. It is impossible to comprehend the Okinawa operation with its more than 1,500 suicide aircraft, or indeed of warfare against Japan, without understanding the defensive arrangements, of which the IFD net was the coordinating and connecting structure.
- Fighter planes, directed to incoming targets by a fighter director and his crew, were the first line of defense against the threat of multiple raids. The fighter director, in radio contact with the combat air patrol, directed the planes to intercept the enemy targets, known as "bogeyes."
- When the fighter director sent his CAP to intercept an enemy raid, he first had to know its location relative to a fixed point. Every island invasion plan designated a specific point for this purpose. At Okinawa it was Cape Zampa Misaki, on the island's west coast, designated "Point Bolo."
- To afford the longest possible warning, destroyers were sent ahead of the fleet or were stationed beyond the island targets, always placing themselves between the defending fleet or base and the expected direction of the attackers. These ships were known as radar pickets—performing the picket's traditional military function of guarding against surprise.
- At Okinawa the Navy had 16 different radar picket stations, though not all of them were occupied at all times. This duty was extremely hazardous because the Japanese tended to concentrate their attacks against the pickets. To afford extra protection, radar picket destroyers were stationed in pairs as often as possible, and at various times two to four LCI(G) gunboats with their strong anti-aircraft batteries were sent along for support.
- Most importantly, the pickets were supposed to have their own CAP overhead, operating under their own fighter director. But CAP defense was often uncertain, as planes were limited by weather conditions and also had to leave the picket area as darkness fell.
- Morison points out, "Twilight was the kamikazes' favorite hour." Unlike the CAP fighters, the Japanese "pilots of the purple twilight" didn't have the problem of finding their way home in the dark.
- In spite of all the Navy's precautions, the experiences of the picket destroyers were terrifying beyond description, with many ships sunk and many more severely damaged, with great loss of life.
- Lieutenant Bob Wallace, USS Idaho.

6 April 1945 - Air Defence

- To understand an exchange over the IFD net, it is necessary to know the lingo. After perhaps hours of complete silence, a typical opening exchange might go something like this:
- "Delegate Base [USS Eldorado], this is Helpmate [a radar picket destroyer]. We see bogey 325, 95, Angels 10, 15 to 20 A/C."
- To this, the fighter director on Admiral Turner's flagship would respond immediately: "This is Delegate Base. Roger, Helpmate. We have your message."
- He then would inform the eagerly listening world: "Exbrook [all ships present]. Exbrook. This is Delegate Base. We designate Helpmate's bogey, Raid One."
- Helpmate's message translates like this: "We see a bogey bearing 325 degrees from Point Bolo, 95 miles from Point Bolo, at 10,000 feet elevation, and comprising an estimated 15 to 20 aircraft."
- In reporting distance or bearing, if there was no hurry, the picket destroyer sometimes said, "90 miles [or the bearing] from Point Bolo," but usually Point Bolo was simply understood. Radar picket destroyers had meaningless call names like "Helpmate," "Horseface," or "Errol Flynn," to mention a few.
- On busy occasions, 6—7 April and 12—13 April, for example, the raids came thick and fast. The fighter director spoke rapidly but never excitedly and kept assigning numbers to the raids as the pickets reported them. The numbers sometimes got up into the 20s, though keeping the raids separate could not have been easy.



6 April 1945 - Air Defence

- The combat air patrol units, usually consisting of four planes, had imaginative call names like "Ruby 2" or "Sharpshooter 3" and were sometimes brought in on the IFD net to try to coach them onto a bogey that was proving difficult to find.
- This color livened up the show, to the great delight of all of us who were listening.
- We might hear the fighter director saying something like this to a CAP unit: "We see merged plot [bogey and CAP are so close together they show up as one blip on the radar]. You should be getting a Talleyho [enemy in sight] soon."
- The young pilots on combat air patrol were always eager and enthusiastic, often seeking to report their successes or "splashes."
- The fighter director was never rude or abrupt with them, for they were key people in the game. He would just say, "I will take your splash reports later."
- Once, when a ship broke into the IFD net saying, "We are in a sinking condition," the response was, "Stay off this circuit. We are handling a big raid"—which the unfortunate reporting ship knew all too well.
- After all, it was not a radio net that was able to send out any help, while, on the other hand, the CAP fighters were players in the game.
- Lieutenant Bob Wallace, USS Idaho.



6 April 1945 - Air Defence

- Although we were never attacked at night, we were always uneasy when it was dark and we could not readily defend ourselves.
- Later on instead of going out to sea in a night retirement, the bombardment ships began anchoring along with the numerous auxiliaries.
- But usually when we were at anchor and a bogey was reported at some distance, we would hear over a loud speaker, "Conductor [Admiral Turner] says, 'Make smoke. Make smoke.'" Smoke generators would soon have us all buried in a heavy bluish haze.
- I wondered what would happen if a bunch of kamikazes came around and saw a lot of masts sticking up out of the smoke. I guess it never happened, because, as far as I know, there were no attacks in the smoke. It turned out to be a pretty secure feeling.
- Lieutenant Bob Wallace, USS Idaho.



The Conductor, Vice Admiral Richmond Kelly Turner.

7 April 1945 - Kamikazes

- 7 April, 0930 a lone "Val" made a determined suicide attempt on Idaho's port beam. The alarm was sounded for general quarters, but the plane was shot down before personnel could man their general quarters stations. Only three 5-inch mounts got into the action, instead of the usual five. The automatic weapons were considered to have gotten the plane.
- a photographer in Texas (BB 35), behind us in column, was able to capture the progress of the entire attack.
- Lieutenant Bob Wallace, USS Idaho.



A Japanese "Val" makes a suicide run on Idaho at Okinawa on 7 April 1945 after being hit by gunfire from a Navy F4F. The battleship's antiaircraft fire has just shot off the plane's starboard wing tip.

USN 317132

7 April 1945 - Kamikazes

- To a person experienced in antiaircraft gunnery, perhaps the most significant feature of these pictures is the smoke that seems to envelop the ship. People who see the pictures invariably say, "The ship has been hit!" The person who wrote the official Navy captions had evidently heard this often enough that he thought it necessary to comment:
- "Smoke is entirely from antiaircraft batteries."
- Duly has since explained that the unusual volume of smoke was largely due to the flashless 5-inch ammunition, which produced little flash but much smoke.
- Lieutenant Bob Wallace, USS Idaho.



The "Val" seen in the previous photograph splashes alongside Idaho. The smoke lingering in the air above the battleship is entirely from the gunfire of its antiaircraft batteries. USN 317133

7 April 1945 - Kamikazes

- Six battleships, with accompanying cruisers and destroyers, were to be sent out to intercept the ultimate kamikaze, the Japanese super battleship Yamato, as she headed for Okinawa, supposedly with just enough fuel for a one-way trip.
- Captain Grassie spoke to the ship's company on the speaker system to explain our strategy. Our battleships planned to intercept Yamato well before daylight to take advantage of our superior radar. It was hoped that we could do enough damage, particularly to her fire control installations, so that we could then close in to finish her off in daylight, thus minimizing the advantage of her massive 18.1-inch guns with their 3,200-pound projectiles.
- At 1848, in rather poor light, all ships fired their 5-inch guns at a "Kate" or "Val" moving parallel down the line of battleships. This plane passed down the battleship line and crash dived into Maryland (BB 46).
- The rest of the day proved to be anticlimactic. When I was next alerted for dawn general quarters on 8 April, I learned that the aircraft from the fast carriers had sunk Yamato the previous afternoon.
- Lieutenant Bob Wallace, USS Idaho.



Yamato during sea trials, October 1941

8 April 1945 – B29s

- In response to the large-scale kamikaze raids on 6 April, XXI Bomber Command conducted major raids on airfields in Kyushu on 8 and 16 April, though the first of these attacks was diverted to strike residential areas in Kagoshima after the airfields were found to be covered by clouds.



A B-29B of the 501st Bombardment Group takes off on a mission on 26 June 1945.

12 April 1945 – Air Defence

- There were no more big attacks in our area until 12 April, when we were told to expect heavy air attacks.
- We always received warnings of impending big raids. These alerts came from the breaking of JN-25, the Japanese Navy's general purpose code. Our people were so expert at decryption by this time that the Japanese practice of changing the code's protective encipherment each month made little difference. The change introduced on 1 April was broken the next day.
- Whenever the word came over the IFD net, "Exbrook. Exbrook. Conductor says, 'Flash Red [enemy planes approaching], Control Yellow [warning alert— nothing is near enough yet to shoot]," we would go to general quarters.



Idaho fires on Japanese positions on the island of Okinawa. The ship located to her left in the distance is Salt Lake City (CL 25).

12 April 1945 – Air Defence

- General quarters was a startling and arresting break in a ship's routine. And after a while at Okinawa it could be scary. We had witnessed a lot of bloodshed in those first weeks. In the officers' wardroom I have seen glasses overturned at the table when people jumped up at the sound of the gong. Our alarm signal was not a semi-buzzer type found on later ships. It was a true, clear bell with a rapid, ominous ring that would wake the dead.
- Then, almost instantly from our superb bugler would come the staccato notes of general quarters: "Ta dadada. Ta dadada. Ta dadada. Ta dada. Ta dadada. Ta dadada. Ta dadada. Ta dada."
- www.youtube.com/watch?v=hvWJlqOy0bs
- And over the loudspeaker (and I do mean loud) would come: "General Quarters. All hands, man your battle stations."
- Then, allowing time for everyone to get in place (if you ran fast enough), the speaker would proclaim, "Now set Condition Zebra. Set Condition Zebra." This meant close all watertight doors, referring to most of the ship's hatches. This accomplished, the ship was now "buttoned up."
- However, on this day we had all gone to general quarters long before any raid reached our vicinity. We knew they were coming, and all of the bombardment ships were gathered together for mutual support.



Idaho fires on Japanese positions on the island of Okinawa. The ship located to her left in the distance is Salt Lake City (CL 25).

12 April 1945 – Air Defence

- Though all remained quiet until 1326, we kept to our battle stations and our ships kept their defensive cruising disposition. We had sandwiches at our battle stations, the automatic weapons crews had stacked extra ready ammunition around their guns and the air was electric.
- Then at 1326 over the IFD net came the word, "Exbrook. Exbrook. Conductor says, 'Flash Red, Control Green [shoot on sight].'" Now the IFD net crackled steadily with reports of raids and directions to the combat air patrol units. As was usually the case, most of the aerial interceptions were successful, but, as often happened, a few were not.
- One raid kept eluding the CAP and kept on coming. Finally, when they were perhaps only 20 or 30 miles away, I told the telephone talkers to get the gun pointers on the phone. I said to them, "This raid is getting through, and it looks as if we are going to have to shoot. If you guys don't think you can hear the talkers, put the phones on your own heads." (This was the last thing that either they or I wanted, of course.) Then over the phone we all heard, "Mr. Wallace, this is Earl. We won't shoot until you give the order."
- I knew then that everything was going to be all right and that everybody was going to be confident and calm. Earl, on a 40mm director, was my senior fire controlman and was as solid as a rock. At just about this moment, two great flamers appeared, falling so slowly, it seemed, with one white parachute descending slowly from the sky.
- Lieutenant Bob Wallace, USS Idaho.



Automatic weapons personnel pose on a quad-40mm mount. Lieutenant Commander G. J. Bishop, Idaho's antiaircraft officer and assistant gunnery officer, is in the front center of the photograph and Bob Wallace is to his left.

12 April 1945 - Kamikazes

- Almost immediately the screen opened fire, and we could see the attacking planes skimming low over the glassy sea. It could not have been a prettier show for our sector.
- The first one was a glider that came directly into the sector where I knew that all of our reticles were tracking smoothly and patiently. In my supreme confidence I waited perhaps too long for the nerves of most of those assembled, but I knew my guns and I knew my guys. Bish slapped me on the shoulder saying, "Shoot. Shoot."
- At 1448.10 I held my speaker button down and said, "All guns commence firing."
- As he was now in range of both the ship's 20s and the quad-40s, a neat and symmetrical triangle of tracers came to a point on his nose. With the convergence of so much destructive power, he was in the water within seconds.
- The action report records that after 25 seconds of firing (at 1448.35) the antiaircraft battery checked fire.
- Lieutenant Bob Wallace, USS Idaho.
- Photo: Taken from the deck of Portland (CA 33), this photograph captures the moment that Idaho splashes a kamikaze off Okinawa on 12 April 1945. Note the flak bursts in the air and shell splashes in the water.



12 April 1945 - Kamikazes

- After a 40-second break, at 1449.15 the port side, including our forward sector, destroyed another plane in a 30-second flurry of firing that ended at 1449.45.
- Like the first one, this kamikaze was smothered by automatic weapons fire and did not even get near the ship.
- Then came a stellar performance by one of my teenagers standing in a 20mm gun tub right next to us in Sky Control. He was a nice, quiet kid from somewhere in the South. One of the Japanese pilots, possibly noticing that his compatriots were not having much luck with Idaho, or perhaps by a prearranged plan, swerved to go past, possibly to go around and attack the ship from a different angle. (This also happened to Tennessee.) He could not have been much more than one or two football fields away as he tried to pass ahead on our side.
- The kid had been one of my most conscientious charges in working hard to master the Mark 14 reticle, and he didn't miss a beat in quickly getting a smooth track. He held his firing lever back for just 15 seconds, but that was enough.
- We could clearly see his tracers, in a full 90-degree deflection shot, seeming to curve into the cockpit. A ball of fire, the plane crashed harmlessly into the China Sea. Bish looked at me gleefully and pointed to our 20mm gunner. It was clearly a one-man feat, done at his own initiative and without orders from anyone.
- Located up high at Sky Control level, our young gunner probably had a better view of the whole picture than others located farther down and somewhat immersed in gun smoke.
- Lieutenant Bob Wallace, USS Idaho.



Automatic weapons personnel pose on a quad-40mm mount. Lieutenant Commander G. J. Bishop, Idaho's antiaircraft officer and assistant gunnery officer, is in the front center of the photograph and Bob Wallace is to his left.

12 April 1945 - Kamikazes

- No doubt also most people had their attention fixed on the serious trouble now approaching so far back on the port quarter that only their guns could bear, and as it turned out not all of those.
- Two "Kates," working as a team, approached, with one a few seconds ahead and slightly to the side of the other.
- The 20mm guns in the Marines' sector were firing steadily but now came the great spectacle of our afternoon. One of our 5-inch guns made one of those rare direct hits that simply obliterates any single-engine plane, especially one carrying a bomb that becomes part of the explosion.
- The impression is always astonishing, because a rapidly moving aircraft seems to stop instantly, like the film stopping in the middle of an old Keystone Kop comedy.
- In the daytime when this occurs there is nothing to see but a heavy, motionless column of black smoke.
- In the night sky, the plane again stops suddenly, but out of the orange fireball one can see a shower of red sparks. I have always thought these were parts of the steel engine disintegrated by the double explosion.
- But now we were subjected to a desperate sequel to this lucky hit on the lead plane. That plane exploded close aboard the port quarter. Both planes were taking 20mm hits when the nearer one blew up.
- Lieutenant Bob Wallace, USS Idaho.



12 April 1945 - Kamikazes

- If we felt any elation at this sudden turn of events, it soon turned to dismay as the sagacious surviving pilot swung quickly in behind the sheltering pall of his companion's destruction.
- He was hidden and our Marines could no longer shoot at him. But the alert Marine loaders apparently took these brief seconds to put fresh drums on their 20mm Oerlikons.
- When he emerged from the smoke, determinedly bearing down on the ship and seeking to strafe with his machine gun, he began absorbing heavy fire from the Marines' 20mms.
- As the kamikaze approached the ship, I had the impression of a man with great sores breaking out all over his face. He did not stop, but his plane could not take so much fire. As he began to fall he headed directly for a young Marine who, like our 20mm gunner in Sky Control, was a real pro.
- He stood there in his tub and fired down the throat of his attacker until the very moment of impact. As I saw the plane seeming to plow into the ship, I bent over to avoid the blast and shock.
- A bomb exploding so close to you does not make a booming sound, as heard in the movies. It makes a crackling sound, like lightning. Even in our high-up position in the forward part of the ship, we were literally showered with debris. A piece of engine block landed in Sky One, the 5-inch director above us, and I picked up from our deck an aluminum rivet with a copper wire attached.
- Lieutenant Bob Wallace, USS Idaho.



The Marine Guard who handled the automatic weapons on Idaho's port quarter: (front row, l to r) Sergeants Comisky, Curtin, Mays, and Austin; (back row, l to r) Lieutenant B. W. "Duly" Dulaney, Captain Bob Daly, and Lieutenant Bill Greenip.

12 April 1945 - Kamikazes

- The official reports gave different estimates of the plane's distance from the ship when it exploded, ranging from 25 feet to 50 yards.
- Obviously, the man who wrote the 50-yard estimate was not a witness. I watched the plane to the moment of impact, and I would estimate it was more like 15 or 20 feet away, at most.
- A more distant explosion was not likely to do all the damage that this one caused. Eight blisters were flooded on Idaho's port side, and the ship suffered extensive damage from flying shrapnel and the shock of the explosion.
- Personnel suffered a number of minor shrapnel wounds, but amazingly only two of these were serious enough to require a short stay in sickbay. Both men were retained on board.
- The Marine who continued to fire up to the moment of impact was only slightly shaken up, I would guess because the bomb exploded so near that he was protected by the armored side of the great ship on which he was standing.
- Lieutenant Bob Wallace, USS Idaho.
- Taken from the deck of Portland (CA 33) this photograph captures the moment that Idaho splashes a kamikaze off Okinawa on 12 April 1945. Note the flak bursts in the air and shell splashes in the water.



16 April 1945 - - Kamikazes

- To keep us on our toes, prowling kamikazes punctuated this activity with frequent air alarms.
- In addition to our normal dawn general quarters, on nine separate occasions during 13-17 April, we heard over the IFD from Admiral Turner on Eldorado: "Exbrook. Exbrook. This is Delegate Base. Conductor says, 'Flash Red, Control Green.'"
- Although the third of the great TEN Go (or Kikusui) raids came on 15-16 April, so effective was the interception by CAP and the antiaircraft fire of ships between us and the Japanese bases that we saw little of the 165 "Floating Chrysanthemums" who sought our blood.
- The ships that paid for our immunity were principally the carrier Intrepid (CV 11) and the six radar picket destroyers that were heavily hit on 16 April, including Pringle (DD 477), which was sunk.
- Laffey (DD 724), despite having a CAP overhead, was the object of 22 separate attacks and was hit by six kamikazes and four bombs, losing 31 killed and 72 wounded— nearly a third of her crew. Yet the ship survived the onslaught and was repaired.
- Lieutenant Bob Wallace, USS Idaho.



As a Fletcher-class destroyer steams by, Intrepid (CV 11) burns after a kamikaze hit off Okinawa on 16 April 1945.

17 April – 11 May 1945 – B29s

- From 17 April until 11 May, when the B-29s were released for other duties, about three-quarters of XXI Bomber Command's effort was applied to attacking airfields and other targets in direct support of the Battle of Okinawa.
- This included 2,104 sorties flown against 17 airfields.
- These raids cost the Command 24 B-29s destroyed and 233 damaged and failed to completely suppress kamikaze attacks from the targeted airfields.



A B-29B of the 501st Bombardment Group takes off on a mission on 26 June 1945.

28 April 1945 - Kamikazes

- A Japanese "Zeke" attempts to crash into the deck of Missouri (BB 63) at Okinawa on 28 April 1945.
- Unsuccessful in the effort, it splashes into the sea moments later.



11 May 1945 - Kamikazes

- On 11 May at midmorning, Bunker Hill was crashed in rapid succession by two kamikazes, which came in completely by surprise.
- It is understandable that nobody could stop these two once they had made their appearance because the first came out of low clouds, while the second came in on the ship in a vertical dive.
- There had been no radar warning, and accordingly nobody had time to do anything.
- Once a carrier that is not "buttoned up" gets hit by two bombs, the damage and casualties are sure to be most severe.
- Bunker Hill suffered greatly from fire and smoke, and in fact a large proportion of her 396 deaths were caused by smoke inhalation.
- When I saw her on 14 May at Ulithi on her way home, she was a sad sight indeed—blackened all over from the fire and splattered throughout by great shrapnel holes, most of which, as in Franklin's case, were caused by the explosion of her own ordnance.
- The fast carriers suffered these terrible ordeals while protecting us and everyone else at Okinawa.
- Lieutenant Bob Wallace, USS Idaho.



Smoke fills the sky as the fire rages on Bunker Hill on 11 May 1945

28 May 1945

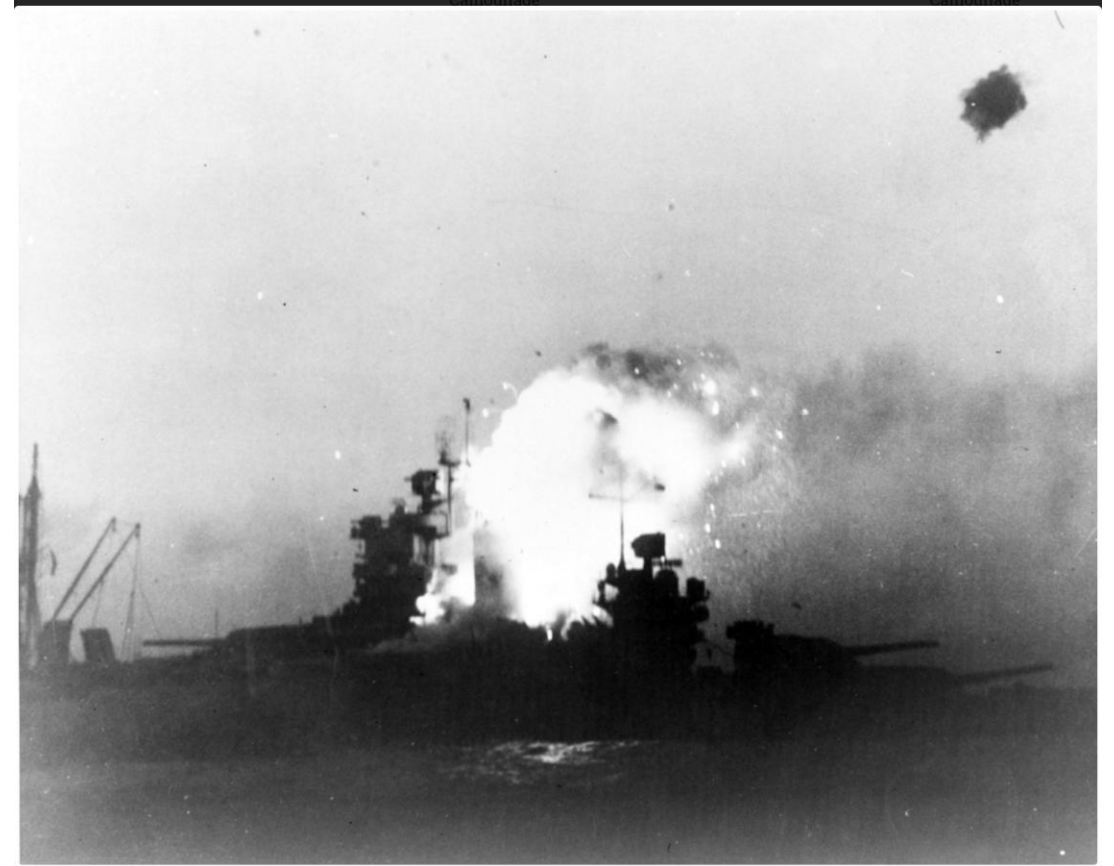
- Just after our return to Okinawa on 23—25 May came another 165-plane raid, the seventh TEN Go. Yet Idaho's war diary shows that following our arrival we carried out our normal bombardment mission at Okinawa, day after day and night after night, with relatively little interference from our aerial tormentors.
- In the seventh and eight raids of 23-25 May and 27-29 May, the slaughter of our radar picket protectors again proved frightful. They paid in blood for the relative freedom with which the bombardment ships were able to support the troops fighting ashore.
- During the seven days of 23—29 May Idaho's war diary shows that "Conductor" gave "Exbrook" a "Flash Red" 12 times—these being equally divided between "Control Yellow" and "Control Green." His "Flash White" [All Clear] usually came after about 30 minutes but occasionally in as little as 5 minutes and as long as one hour.
- In all of this ordeal, we never saw a Japanese plane. "Flash Red" meant that the bombardment ships would cease the exercise of our principal mission and stand around for a few minutes from time to time just in case a few Kikusui made it past our protective shield, as had happened on the afternoons of 6 and 12 April.



The U.S. Navy destroyer USS Drexler (DD-741) underway off Cape Elizabeth, Maine (USA), on 14 November 1944. She is painted in Camouflage Measure 32, Design 11A. At 07:03 on 28 May she was hit by a second aircraft and the impact rolled her on to her beam ends, causing her to sink in less than 50 seconds. Because of the speed with which she sank, casualties were heavy: 168 dead and 52 wounded.

March to July 1945 - Sea

- During the battle for Okinawa from 19 March to 30 July 1945 166 allied ships were damaged by enemy action of which 63 were sunk or damaged so badly they had to be scuttled or decommissioned.
- 40 of those sunk or scuttled were destroyers or similar mainly from the radar picket line.
- Casualties were 4,582 killed and 6,043 wounded.
- The worst casualties were the Essex class carriers Franklin, 807 kia, 487 wia and Bunker Hill, 396 kia, 264 wia. The destroyer Morrison hit by 4 Kamikazes and sunk, may have had the highest percentage of casualties, 159 kia and 102 wia.
- Photo: USS New Mexico is hit by a Kamikaze at dusk on 12 May 1945, while off Okinawa. Photographed from USS Wichita (CA-45).



March to July 1945 - Kamikazes

- The great majority of pilots who flew from Japan intent upon making a suicide crash never saw an American ship. They were detected by radar and shot down far short of their intended targets by the CAP fighters.
- Suicide planes had to travel over a several hundred-mile stretch of largely empty ocean before reaching their intended victims off Okinawa. It was this distance that made it possible for our radar to detect and intercept the planes so effectively.
- In an invasion of the Japanese Home Islands there would be no ocean between the ships and their attackers, and little time for radar warning.
- Considering the destruction caused by the relatively few kamikazes that got past the combat air patrols at Okinawa, it is chilling to contemplate the situation in an invasion of Kyushu, where our CAPs would have had to operate with only a few minutes of radar warning of incoming planes.

