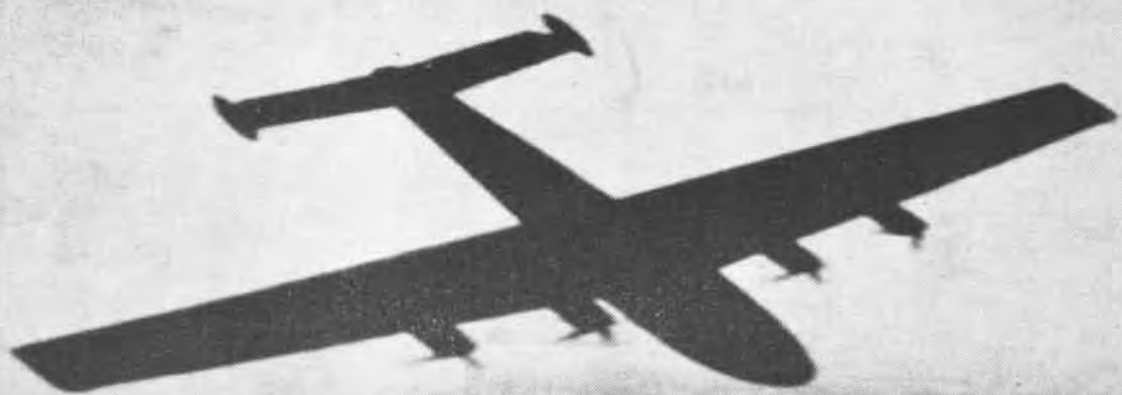


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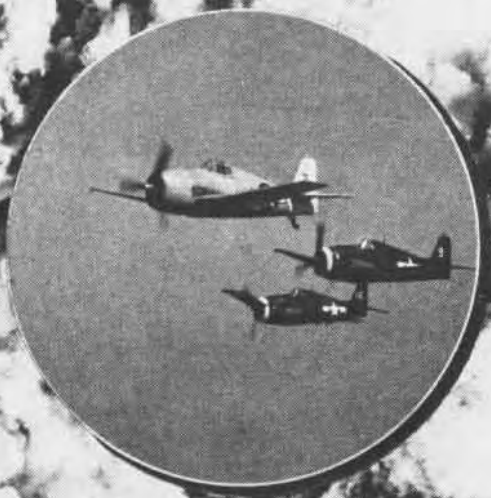
NEWS



Carrier Photo Recco
Cycloid Propellers

November 1946





**CARRIER
PHOTO
RECCO**



SAIDOR'S AIRBORNE PHOTOGRAPHERS LISTEN INTENTLY AS THEY ARE BRIEFED ON THEIR VARIED OPERATION CROSSROADS MISSIONS

Navy's Flying Photographers Developed Carrier Reconnaissance into New Science

CARRIER photographers and technicians who made *Operations Crossroads* the most photographed event in history didn't come by their trade by accident.

When V-J Day arrived and the Navy's shutterbugs secured to their private darkrooms, they had made Japan the best photographed nation in the world. Special schools were turning out carrier photo pilots who got ringside seats at every major action.

At the outbreak of the war little was asked or expected of carriers in the way of photo reconnaissance. With the realization that 80-90% of all intelligence data is gained from aerial photographs by the use of overlapping stereo pairs, the Navy took immediate steps to keep pace with modern photo requirements.

Ignoring more obvious fruits of battle in order to carry out routine photo hops is hard for new pilots. As soon as the bug bites them, however, they seem unable to see A/A bursts or tracers curling around their wing-tips. The pictures they daringly took helped ACI officers assess damage and to direct returning strikes to hit the enemy where he most needed to be hit.

Although it is impossible for a carrier photo pilot to take a double exposure, he has many problems akin to those encountered by any embryo photographer. Many recco pilots wait until the last second to open their fuselage camera ports to avoid dirty camera lenses. One red-faced pilot, just returned from making runs at 800 feet over hostile Guam beaches, confessed to intelligence officers:

"I was really embarrassed to find my oblique camera hatches closed after my second run. The A/A was terrific and I had to go back in for a third run over the same damn area."





Photo reconnaissance students at Whiting Field photography school learn fundamentals of aerial photography before taking to the air



Enlisted technicians ready cameras for student recco hop; without specialists, carrier photography could not maintain high standard



Students plan division mapping hop calling for overlapping flight lines; camera port for oblique shots can be seen under plane wing

Special Training Given Photo Pilots Paid Off for First Time in the Africa Invasion

A FEW HUNDRED miles off Okinawa, the Fifth Fleet awaited the sunrise to begin launching strikes. The blacked out ships were cruising on calm waters, but inside one carrier all was not so serene.

The flight officer was catching hell from pilots, who asked: "We came out here to fight a war. How come we have to escort photo planes?"

Even the flight officer couldn't answer that one. All he knew was that the flight schedule called for whole divisions of photo planes and strong escorts. Someone evidently wanted pictures and wanted them badly.

Although photo coverage was the primary mission of the Fifth Fleet's visit to Okinawa during the first days of March 1944, it couldn't be told. Only a few of the photo reconnaissance teams knew that their pictures were vitally needed for the coming invasion of Okinawa.

The men who planned invasions back at Guam and Pearl Harbor needed Sonne strip pictures of the beaches. These continuous strip pictures, taken at low altitude by a special camera, could reveal the depth of water over the reefs. The planners had to know where heavy artillery could get ashore and where infantrymen might wade ashore.

They needed vertical and oblique photos to find out what was back of the beaches—gun emplacements, caves and other anti-invasion defenses. Pre-invasion bombarding forces needed up-to-date maps to clear the way for the Marines.

Every strike approaching the island after sun up brought in at least one division of photo reconnaissance pilots in *Hellcats*. Back of the armor plate in each plane rode cameras in special mounts which allowed them to make verticals or obliques through ports in the fuselage.

Just 26 days before the landings were scheduled to take place, the photographic interpretation officers at Guam received the rolls of film taken over the Okinawa beaches.

Photo reconnaissance from carriers hasn't always been so precise, however. Prior to the 1940's, carrier-based photography was haphazard in its planning and application. There was no accepted VF camera installation.

By the middle of 1940 pilots were receiving six weeks of training under ComAirLant in F3F-3P's. In 1941 a similar Pacific Fleet Air Photographic Unit was set up at San Diego.

This special training for carrier photo pilots paid off for the first time in the invasion of Africa. Planes operating from one of our large carriers cooperated with Army recco planes to discover cleverly camouflaged German aircraft.

AS THE carrier offensive gathered momentum in late 1943 and early 1944 the Navy rushed the training of aircrewmen in photography. Task group commanders soon suggested that all carrier air groups have a fighter plane equipped to carry out photo missions. All VF camera installations up to that time had been local jury rig affairs.

In April 1944 their prayers were answered; San Diego A&R change No. 113 was issued to accommodate various aerial camera installations. By this time photography training schools were going full blast at Norfolk, San Diego, Harrisburg and Barber's Point. Thus the stage was set for carrier-photo reconnaissance to become an important part of naval aviation.

The idea of having all their bomb drops recorded by the all-seeing eye of a vertical or oblique aerial camera was not too popular with pilots at first. Many pilots had to revise estimates of damage when prints were rushed from labs.

Two specially trained VF-1 pilots aboard the *Yorktown* were among the first to serve with the Pacific Fleet. They soon found the two photo VF not enough for a CV. By the middle of 1945 each Fast Carrier Task Group Commander was assigned a Photo Recco Unit. Each consisted of six specially trained VF pilots, two photographer's mates and four photographic F6F(P)'s.

Although often lacking the immediate thrills of other combat hops, photo-reconnaissance flying takes as much or more precision on the part of the pilot. Cameras and lenses must not be tilted more than three degrees from the vertical—precluding banking or steep turns to avoid A/A.

On low altitude oblique beach runs, pilots must hold their prescribed altitude within 10 feet—a feat which even the best aviators find difficult under ideal circumstances.

THE two principal uses of carrier photographs are (1.) the immediate operational intelligence data that can be gained from aerial photos for use by succeeding carrier strikes, and (2.) the overall strategic intelligence data that is of value to ground troops and planning agencies.

Pilots aspiring to careers as carrier photo recco pilots today get the word on the latest methods at the USN School of Photographic Reconnaissance at Pensacola. Established at Whiting Field under Chief Naval Air Advanced Training, Jacksonville, this post-war establishment replaces like schools in the various fleet commands.

Students will go through the basic school in photography, the same as is given enlisted men, before going on to aerial camera studies in combat aircraft.

Following are the different types of aerial photographic missions given students of carrier photo recco:

Verticals—Aerial photos made by shooting straight down. They possess much detail, accuracy, can be made over inaccessible areas and can be speedily made into mosaic maps. Pilots must predetermine exact ground speed, intervalometer setting and altitude required to give the desired 60% overlap in a series of verticals. This line of flight overlap is often used on targets for single reconnaissance strips so that intelligence can use stereoscopes for three-dimensional views.

Pinpointing—A vertical photograph in which the principal point of interest is located at the center of the photo.

Mosaic—(multiple strip mapping) A series of two or more single vertical strips which overlap by 40-50%. This side overlap, necessary for accurate maps, is often accomplished by divisions flying as teams.

Obliques—These are made by tilting the camera from the vertical. There are "high" and "low" obliques which are used in conjunction with verticals for intelligence purposes.

Trimetrogon—Three cameras overlap each other so that a photographic strip is made from horizon to horizon. This installation, utilizing one vertical and two oblique cameras, maps large areas with a minimum of time and effort.

Dicing—Oblique photos from as low an altitude as possible. Using a K-25 camera, VF can also shoot astern. Originating in RAF, dicing gets under low-hanging camouflage.

One of the outstanding developments of the war was the Sonne camera for water depth determination. Developed by the Navy Photo Science Laboratory and the Photo Intelligence Center in Washington, the camera uses two lenses, one tilted aft and one forward. Thus the camera can take large-scale stereo pairs on a continuous strip. A stereo comparator measures the distance between the surface of the water and the bottom. Average camera error is six inches.

Large scale photos, taken at altitudes of 100-300 feet over Okinawa provided ground support information that was not available by any other photographic means. The camera can take photographs at air speeds even greater than 1000 mph.



Off on their first photo mission, pilots come face to face with an intricate check-off list, learn the necessity for precision flying



Back on the ground, labs use latest methods to turn out the films in record time; during war wet prints were rushed to intelligence



Instructor points out errors in mosaic taken by student division; Stereoscope viewer is visible on left, single recco strip at right



Sador photo pilots devised method of obtaining target array maps, kept varied pictorial record of big show from their ringside seats

Sador, Converted into Photography Lab, Was Headquarters for Crossroads Pilots

CARRIER photo pilots helped make *Operation Crossroads* the most photographed event of all time. Carrier reconnaissance, through the precision of its photo pilots, the know-how of its technicians and the perfection of its photo equipment, had a major part in making it so.

Crossroads photographic operational headquarters was the escort carrier *Sador* (CVE 117). Specially rigged for the operation, she was at one and the same time an operational flattop for photo planes, a floating lab for film processing and a houseboat hotel for Bikini-based photographers.

Topside the *Sador*, except for an occasional helicopter hovering above her flight deck, looked like any other late-model CVE. On the hangar deck her three-sided photographic mission was immediately apparent. Crates of photo gear piled halfway to the overhead amidships.

On the starboard side stood four large refrigerators for storing perishable photo supplies. The converted starboard



Something new to carrier photo pilots was this movie camera rigged to bomb rack of F6F; drones carried remote control equipment



Careful planning put maximum number of photo planes over the atom blasts where carrier pilots utilized techniques learned in war

ready room served as processing laboratory and the port ready room as photographic administration office.

At Bikini the *Sador's* flight deck carried *Hellcats* modified into F6F-5P's, *Avengers* specially adapted for photo use, four TBM's from the *Shangri-la* that on Able and Baker days controlled the radiological drone, boats, two Grumman *Ducks* and four helicopters.

For the *Sador* and its photographic personnel, organizational work began in March with the delivery of seven *Hellcats* and five TBM-3E's. This was at Pearl Harbor. Turret assemblies were removed from the TBM's and A&R installed platforms for motion picture photographers.

With the photoplanes came photo pilots, carefully selected from Crossroads volunteers. Few of these men had had previous carrier photo pilot duty.

Training started immediately. While still in Hawaii the men selected to fly the Navy's carrier-based photo planes over Bikini got their initial taste of flying vertical strip maps and pin pointing targets. There they made multiple flight line mosaics, practiced formation coverage of areas and learned about flying Sonne strip runs over Oahu beaches.



Technician loads magazine of K-17 vertical camera; *Hellcat* mount also holds two oblique cameras for shooting out of fuselage ports

When the *Saidor* shoved off from San Diego to pick up supplies and technical crews, the photo pilots and their planes came along. Flight lines resembling Bikini lagoon in size and shape were laid out over San Diego bay and all hands began concentrating on the *Crossroads* "op plan."

Senior officers carefully checked the work of individual pilots to determine which men did what types of photographic flying best. On the basis of this screening, pilots were assigned to those fields of aerial photography in which they were most proficient.

After reaching Bikini, it took just one operational flight to convince all hands that changes were necessary in the *Crossroads* plans for photo recon. In the original plan two *Hellcats*, using K-17 12" and 6" cameras were to fly a total of 14 flight lines. This required 30 minutes.

In that time target ships could, and did, swing up to 30 degrees. Laying down a mosaic map of the fleet under those conditions was impossible. The *Saidor's* installation section quickly came up with a new plan calling for four rather than two *Hellcats* and a pair of K-18 24" cameras.

Doubling the number of planes and increasing camera sizes reduced flight lines required from fourteen to four.

THE PHOTO pilots themselves developed the method for flying the target array maps. The four *Hellcats* approached the flight line at 90° from course in a right or left echelon. After passing two miles beyond the flight lines, the planes broke off away from the target at eight or 14 second intervals, depending on altitude, in a 30° bank 180° turn. The maneuver sets up the planes with approximately a correct interval between flight lines in a tail chase formation. In practice the turn was nearly in unison and the four *Hellcats* roared across the target ships abreast.

The mission of the *Saidor's* photo pilots at Bikini was five-fold. First they were charged with the responsibility for vertical coverage of the target fleet. Exact positions of each target vessel had to be determined immediately prior to each detonation.

Secondly the photo pilots made trimetrogon coverages of the target array to determine ship positions, utilizing images obtained from land control points in oblique photographs to tie in the pictures obtained with the vertical camera.

The third part of their mission included vertical stereo coverage of the lagoon side of Bikini island with the Sonne strip camera to obtain detailed analysis of the bottom area



Huge complement of photo personnel, technicians was needed since *Saidor* was literally floating photo laboratory for Bikini Test



Extremely good still and motion pictures were taken from modified turrets of *Saidor's* *Avengers*; special crutch held F-56 20" camera

from the shore line out to an approximate depth of 20 feet. This photo coverage proved to be extremely valuable in evaluating wave motion and damage caused by explosions.

Their fourth mission included making oblique photographs of the target array, the blast and blast phenomena for public information. The fifth and final part of the photo pilots' mission was motion picture coverage.

The Sonne cameras proved highly valuable in damage assessment work. From this color film it was possible to accurately assess damage on certain ships long before boarding parties could safely go aboard.

This was particularly true in the Baker test where radio activity was so strong that boarding parties were kept off certain target ships for many days. Where hatches were left uncovered or knocked off, the stereo film photographed damage even inside the holds of target ships.

When its carrier type photo planes were immobilized during periods at anchor inside the lagoon, the *Saidor* relied on the two Grumman *Ducks* and its four helicopters for special rush job aerial photographic assignments. Immediately after Baker day five helicopter flights were made to remove film from islands bordering the radio active Bikini lagoon.



Round the clock schedule of film processing required this mountain of equipment, leaving little room for photo planes in hangar deck