

## PHOTOGRAPHIC AVIATION\*

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THE development and use of photogrammetric compilation equipment and the activities of the Aeronautical Chart Service will be covered in other papers to be presented. Therefore, this paper will be confined to photographic aviation.

It is the responsibility of the Army Air Forces to perform aerial photography for the production of precise maps, aeronautical charts, target charts, mosaics and also photographic reconnaissance for strategic and tactical planning for the employment of the land, sea and air forces.

Three types of units are operating in the theatres to produce photography to meet these various requirements.

1. Heavy Mapping squadrons—Equipped with airplanes of the heavy bomber type, in which can be installed as many as eleven cameras. These heavy combat mapping planes carry large crews, including pilots, navigator, camera operator, engineer, radio operator and gunners. These squadrons are provided to perform precise mapping photography to meet approved specifications of the Corps of Engineers, which is charged with the production of precise maps for military purposes.

2. Photographic Reconnaissance squadrons—Equipped with F-5 airplanes. The F-5 is a converted P-38 with a battery of five cameras in the nose in place of guns. They are single seaters and have an operational range of several hundred miles, depending on the enemy defenses in the areas in which they operate. Photographic Reconnaissance Squadrons perform charting, strategic, and tactical photography. The P-38 is being employed as a combat mapping airplane in some very heavily defended areas where the slower bomber type could not survive.

3. Tactical Reconnaissance Squadrons—These squadrons are equipped with fast single-engine fighter type aircraft which perform tactical reconnaissance from a low altitude—usually over very heavily defended areas for ground force operations. Each plane carries a single camera.

One of the most dramatic chapters in the history of World War II will be written around the P-38—Photo charting and reconnaissance airplanes—and the pilots who are flying them in all theaters where they are gaining recognition for their outstanding performances.

An unusual achievement was that of a photo reconnaissance group operating in one of the theaters where the enemy defenses are most heavily concentrated. In this theater the air force commander was charged with the performance of mapping photography for the Corps of Engineers. In order to accomplish this most important mission and to meet the strict specifications of the Engineers, it was believed that a single airplane of B-17 or B-24 type would have no chance of survival. The Commanding General of the air force called a meeting of the commander of the bombardment and fighter forces to discuss ways and means of meeting the requirement. It was estimated that to secure photographic coverage of this area, a large number of B-17's would be required and that heavy fighter escort would have to be provided and that possibly bombardment diversion missions would have to be performed in areas at a distance from the area to be photographed, and that very heavy losses would result. It was finally decided that an attempt should be made by the photographic reconnaissance group using P-38's to secure this coverage before sending in slower combat mapping airplanes with fighter escort.

The job was undertaken by the photographic reconnaissance group and

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shortly after the commencement of operations, a letter of commendation was received from the chief engineer of the theater on the high quality of the mapping photography produced by the P-38. When the mission was about 70% completed, the following commendation was received from the chief engineer:

"1. It is a distinct pleasure for me to be able to command the \_\_\_\_\_ Photo Reconnaissance and Mapping Group for a recent performance which produced the most skillfully flown systematic mapping photography we have seen thus far in this theater.

"2. On sortie number \_\_\_\_\_, covering an area of approximately 1,400 square miles, rectangular in shape and covered by 4 strips of mapping photography, there was produced what must be as near to perfect mapping photography as present equipment and tactics will allow. The area lies to the West of \_\_\_\_\_, and the pilot responsible was confronted with all the hazards common to a mission of this type in heavily defended enemy territory.

"3. The above exhibition of great flying skill under adverse conditions warrants high praise, and I am delighted to take this opportunity to express my sincere appreciation to you and to the \_\_\_\_\_ Photo Reconnaissance and Mapping Group for the fine co-operation we have had in securing mapping photography recently, for the splendid display of enthusiasm in tackling this most difficult assignment, and for the real and material progress being made in development of the precision flying skill required on the part of the pilots assigned to this duty.

"4. It would be appreciated very much if you should see fit to pass on to the officers and men of the \_\_\_\_\_ Photo Reconnaissance and Mapping Group, my appreciation of the fine work which they are doing for us in the field of mapping photography. The product of their efforts is most gratefully received and their increasing skill is noted with satisfaction. I am fully aware of the difficulties involved in the missions which this Group is performing for the mapping program and which call for the highest possible order of navigational and flying skill, even when there is no enemy opposition with which to contend.

"5. I should be especially grateful to you if you will pass on to the pilot who flew Sortie No. \_\_\_\_\_ my commendation for this especially fine demonstration of superior skill in the execution of a mapping mission."

It is appreciated that the photography produced by the P-38 does not completely satisfy the requirements of the Engineers for map making with the multiplex equipment, but they are using it and great credit is due the Engineer compilation units for making their mapping processes conform to the photography obtained in photo reconnaissance airplanes.

Every effort is being made by the air forces to develop and provide equipment and facilities to meet requirements for precise mapping photography.

Speed and range at high altitude are the most essential requirements of a photographic airplane. It must meet and exceed the long range of the bombardment airplane and above all, it must meet and exceed the altitude performance, speed performance and, if possible, maneuverability of enemy fighter development. It is believed that any new photographic airplane must be capable of existing against heavy enemy opposition and of retaining essential mapping, charting, and strategic photography.

An automatic stabilized camera mount for mapping cameras has been developed and tested in the P-38. Tests so far indicate that it will produce more satisfactory results than the present stationery camera in the P-38.

The success or failure of a task force operation or an entire campaign may depend entirely on photographic reconnaissance. The following extract from a Tunisian Campaign report bears out this statement:

"The battle of Tunisia reached its final stages about the first of May and the final attack on Tunis, and Bizerte was to take place on the third of May. The photographic unit was informed of this on the 29th of April and our job was to photograph all the front line positions. The purpose of this mission was to locate enemy artillery positions and concentrations. Due to bad weather, on the following days, we were unable to get the desired photographic coverage. Because of this, the attacks of the ground forces were postponed until our mission could be completed. Photographic coverage of the front line area which consisted of a strip, 30 miles wide and 150 miles long, was completed in one morning of flying. Interpretation of photographs at this point was supplemented by several counter battery officers from the Army Corps who had flash spotted the enemy artillery positions and with their help, the interpreters were able to locate the enemy positions. These positions were pin-pointed by co-ordinates and sent forward with the photographs. After all interpretation was completed, which was accomplished by noon of the following day after the mission was flown, all the information was forwarded to the Armies. Our own artillery preferred to fire from the photograph rather than a map.

"The attack was then scheduled for the 7th of May to be preceded by an artillery barrage that night. A very heavy concentration of artillery was fired at the positions marked on the photographs. After an all night barrage, the attack was carried forward, and the First Army took the city of Tunis, twenty four (24) hours after the attack began. The enemy opposition was so light that only a hundred casualties were inflicted on the British First Army.

"With the campaign ended, we decided to check the accuracy of our photo interpretation and with several Army Commanders, visited the enemy artillery positions. It was found that our own artillery had been so accurate that all enemy positions had been put out of action. The accuracy was to such a degree that in many cases, the enemy guns received a direct hit and in no case was a position missed by more than five yards, which of course, was enough to put the crew out of commission.

"Interrogation of German and Italian prisoners revealed that this barrage was incredible and that they were unable to understand how their positions were discovered since they had moved them only several days before this final attack.

"During the operation of this photographic unit, it suffered no casualties, flew on the average of four to five missions a day, and on occasion, as many as eleven missions, and covered all requests from various armies that have been before mentioned. It was the first Photo Reconnaissance unit used in ground co-operation, and proved its ability and worthiness by the fact that in Italy today, there are three squadrons acting in cooperation of the ground forces and every Army Commander considers Photo Reconnaissance as a highly important part of his organization.

"Commendations have been received from the outstanding commanders of the North African Theater testifying to the ability of Photo Reconnaissance, and in some instances, claiming the success of operations in that theater were entirely due to Photo Reconnaissance."

Another report of the activities of photographic aviation in one of our active theaters presents a good picture of the magnitude of photographic aviation operations and its importance to land, sea and air operations. In 45 days of operations, photographic reconnaissance and mapping units in \_\_\_\_\_ theater established this performance record:

850 missions were flown, of which 766 obtained photographs. Half of the total were combat mapping missions.

An area equal to the size of Texas was mapped.



Provided twice daily, daily and periodic reconnaissance on all airdromes, port and communication targets required in the theater.

951 interpretation reports on reconnaissance missions and 196 bomb damage assessment reports were issued.

A record of 43 targets was established in a single reconnaissance mission.

350 miles of mapping strips were flown in a single mission.

Over 1 and a quarter million contact prints; 215,000 aerial negatives; 80,000 duplicate negatives; and 4,400 enlargements were produced from the laboratory.

Mosaics covering approximately 16,500 square miles were produced.

Numerous low level tactical reconnaissance missions covering invasion coast were flown in P-38's.

The demands from the commanders of the armies, planning staffs, survey and air and ground forces were frequently required at extremely short time limits; and it is noteworthy that the laboratory met all the demands to time without exception.

Many difficulties were experienced, due to the intensive pressure of the demands. All the machines were working at maximum output almost continuously for over 40 days. Personnel worked in continuous shifts, and breakdowns of equipment were only averted by constant surveillance and marked ingenuity.

The main water supply was inadequate, and local wells were tapped to increase the supply. At one period the water supply failed altogether, and jeeps containing prints were rushed down to the sea where the prints were washed in sea water. Power was also a great problem, and all types of generators from large Diesels to small enemy lighting sets were borrowed to supplement the main power. Supplies were often short, but good use was made of captured enemy paper and chemicals.

The job of the mapping and photographic pilot is a tough one. They are the only individualists left in aerial warfare, and they are the only pilots for whom it is both a duty and an honor to run from the enemy.

The heavy combat mapping airplanes are armed and usually fly singly without fighter escort. The P-38's are unarmed and have to depend entirely on speed and evasive tactics to get away from attacking enemy aircraft. The heroic deeds of our photo pilots are becoming numerous. I shall read the award of the DSC to one of our photographic reconnaissance pilots in the Southwest Pacific, to show the calibre of men who are producing aerial photography in this war.

"*MAJOR ARTHUR L. POST* (then Captain), Air Corps, United States Army. For extraordinary heroism in action near Rabaul, New Britain, from 20 June to 28 September 1943. Major Post in an unarmed and unescorted aircraft voluntarily undertook a photographic mission over Rabaul. Under attack by enemy interceptors, he completed his photographic run, and sighting an enemy convoy, photographed it also. After he had evaded the attacking planes with great skill for some time, and had sheared off the wing tip of one of them, both his engines were finally shot out. He jumped from his crashing plane, and to avoid being strafed, pulled the rip cord of his parachute at only five hundred feet. Landing severely burned, with an injured leg, and in close proximity to the powerful enemy base, he contrived to find native assistance and eluded enemy patrols. Major Post exhibited great daring, determination and resourcefulness in this mission and its profitable sequel."

#### AIR MEDAL

"For heroism in flight and exceptional and outstanding accomplishment in the face of great danger above and beyond the line of duty over the Rabaul area, New Britain, on 25 May 1943. Major Post piloted an unarmed P-38 type

aircraft on a photographic mission and obtained valuable operational photographs of Vunakanau Airdrome, Kervat Airdrome, Saragi Plantation and Palagumar Bay. He encountered a new type of enemy fighter airplane over the Vunakanau Airdrome and he obtained an accurate sketch and description of it. Upon reaching the Gazelle Peninsula, Major Post encountered unfavorable weather conditions at the normal altitudes so he made the photographic runs from altitudes of 13,000 and 13,600 feet. The courage, skill and determination displayed by Major Post, in making photographic runs at such hazardous altitudes, are worthy of the highest commendation."

*Photo Interpretation.* Photographic interpretation is a most essential step in the procurement of information relative to the enemy. The art of technique of interpreting aerial photography is highly technical and specialized. Proficient, reliable interpreters are few and far between. Great care must be used in the selection, training, and assignment of these officers. Upon their interpretation lies the fate of many military moves.

Specialized interpreters can accurately identify most of the enemy naval units by name, spot new types of aircraft, and locate enemy gun positions. Camouflage installations, dummies, and decoys constructed by the enemy may be detected on an aerial photograph by the interpreter. By their knowledge of vital bottlenecks and vulnerable points in industrial installations the interpreter is able to locate important targets and to determine the extent of damage done by bombing raids to industrial targets.

The destruction of the Huls' synthetic rubber plant, a source of the large percentage of the German rubber supply, was the result of a careful interpretation based on intensive photographic reconnaissance. After the factory was identified, the next step was to determine the vital portions which had to be destroyed to put the whole plant out of commission. A knowledge of the synthetic rubber process, applied to the photographs of the plant, showed one of the most vulnerable points was a large boiler house. This was used as the aiming point by the bombardiers. Results were so successful that months later interpreted aerial photographs showed that the enemy had not even started repair on that Plant. In many cases the photo interpreter is able to estimate the probable length of time required by the enemy to repair a bombed industry and put it back in production.

The enemy's use of a radio detection apparatus, shaped like a large basket, was first found by photographic interpreters on aerial photographs taken of the enemy coastal areas. This apparatus was used to plot the course of allied aircraft. Since the instruments were limited to certain coastal areas, it was presumed that the supply was insufficient and a bomb in the production would seriously affect the efficiency of the enemies aircraft warning net. One morning an interpreter, studying photographs taken deep in enemy territory, discovered some of these sets in a clearing around an old Zeppelin plant. Thus the birthplace of those radio detection devices was discovered. As you may well guess, this newly discovered plant soon became the "target for tonight" and the Jerries aircraft warning system was handicapped.

The interpreter, from his study of aerial photographs, is able to determine the enemies strength and position, to locate his important shipping ports, and railroad supply lines. This information is often only a few hours old and is usually kept up to date by continuous photographic coverage. Photographic reconnaissance, coupled with photographic interpretation, is a relentless secret agent, giving the enemy no rest, no security; it reveals the enemies strength, probes his weakness and blunts his weapon of secrecy.