

Information Division
Air Service

January 19, 1926

Munitions Building
Washington, D.C.

The chief purpose of this publication is to distribute information on aeronautics to the flying personnel in the Regular Army, Reserve Corps, National Guard and others connected with aviation.

---oOo---

FIRST AIR FLASH-LIGHT PHOTOGRAPHS MADE

By A.M. Jacobs

Among the most busily followed projects sponsored by the Engineering Division, McCook Field, are those connected with the development of aerial photography. Night photography in particular has recently been receiving rather intensive study and experimentation under the direction of Lieut. George Goddard. This officer, for some time a firm disciple of the belief in the possibility of taking flash light pictures of large areas by night, has persistently pursued what some thought a "will-o'-the-wisp", doggedly working out equipment, overcoming faults in it, experimenting and perfecting it, with Dr. S.M. Burka as his able assistant.

Experiments were carried out on a small scale at the Engineering Division with more or less success, but recently, when all preparations had been completed, a Martin Bomber equipped for night flying, in which were mounted seven aircraft cameras and one moving picture camera, left McCook Field for Britton Field, Rochester, N.Y. Aboard were Lieut. Donald L. Bruner, pilot; Lieut. George Goddard; Dr. Burka; and Lieut. R.C. Coupland of the Ordnance Department. The tests were successful. They took the world's first flashlight photograph by air.

The aircraft cameras were the Army types K-1, K-3 and an old Gaumont, all equipped with the fastest lenses known. The K-1 camera was of Eastman manufacture, as well as the hypersensitized panchromatic film used in all the exposures. The motion picture camera was a high-speed type for the purpose of recording the speed of the flashlights. The plane also carried two bombs containing fifty pounds each of special flashlight powder, attached to parachutes and equipped with double-time fuses. The shells of these bombs were of slightly different size and shape for purposes of comparative test.

Rochester was selected for the experiment because of the location there of the Eastman Kodak Company, which has in its possession an instrument called a photometer, the only one of its kind in the United States, by which the intensity of light waves from the sun, a lightning flash in a storm, an electrical display, and, in fact, any kind of light may be measured. It was especially desired to have this instrument measure the light waves from the flash light bombs, for if the flash proved successful with the amount of powder used at the altitude selected, the amounts for various other altitudes could be computed from the photometer reading.

When the Martin arrived at Britton Field, plans for the experiment were immediately worked out with the Eastman Kodak Company who placed the full resources of their splendid laboratories at the Army's disposal. Lieut. Goddard described his project to Mr. George Eastman, who was an interested listener. The photometer had to be moved to the top of the fourteen story Eastman Building for the test. Red flash lights were supplied for the observers who would watch the plane from the top of the building in order that they might signal the approaching bomber on the night of the test that all was in readiness for taking the photometer reading. The entire Eastman Research Laboratory force were to act as witnesses and give suggestions for improvement of the development.

On the night of the test all was in readiness, and the following is abstracted from the Rochester Evening Journal and Post Express, describing the event:

"The Martin Bomber left Britton Field a few minutes after seven o'clock proceeding on a location flight that led to a point near Cob's Hill reservoir, returning over Monroe Ave. and the downtown section. Retracing its course, the plane then came sweeping toward the Platt Street bridge, resembling a giant firefly, with its blinking white searchlight revealing its place against the background of hazy clouds that separated the city from the starlit sky. Suddenly the plane swerved until it was directly above its objective, the bridge."

The observers on the Eastman Kodak Company's tower signalled the bomber with

V-5524, A S

one of their red flares. The bomber responded to its signal by the flashing of its searchlight. Over the Genesee River, one of the bomb-weighted parachutes was dropped. The bomb burst with a terrific explosion. The human eye is so constructed that it cannot take in a light flash swifter than $1/6$ of a second. So swift was this flash - lasting out $1/20$ of a second - that it was invisible to the observers, who thought that the flash device had failed and there had been no picture. It is interesting to note, however, that the best prints were obtained from this first flash. About fifteen minutes later the second and smaller bomb was dropped, proving the more brilliant of the two. The duration of this flash was about $1/2$ second, the city was brilliantly illuminated and even residents on the outskirts saw the clear white ray.

All had transpired as was planned. The night was fine. The bomber was taken to 3,000 feet, for which altitude all exposures had been set. Below the air was clear, though 300 feet above was a layer of clouds which took on a strangely rosy glow as they caught the reflection of city lights. Both bombs functioned perfectly, three square miles of the city's area being lighted by them.

A certain tenseness was apparent among the workers next day until Lieut. Goddard came from the Eastman dark rooms about one o'clock and announced that the prints of the exposures made the night before were a success. Examination of them brought decided enthusiasm. River, buildings, highways, and the bridge were almost as clear as in sunlight exposures. Even automobiles on the bridge were readily discernible. The smoke above a factory was clearly indicated. If it were smoke caused by the explosion of a war-time bomb, it would be equally clear, suggesting the possibility of the photographic plane following the night bomber, to ascertain whether the bombs dropped had struck their objective and the approximate amount of damage caused. In fact, the development promises to prove a remarkable step forward, not only in the science of photography but as a military asset. Enemy cities, arsenals, depots, trenches will lie exposed to the camera's accurate eye during those hours when it is most difficult to spot the plane with anti-aircraft guns. And now that films may be developed in the confines of the plane while it is still in flight, in seven minutes time, pictures may be made of designated locations, the prints developed during the return flight to headquarters, dropped upon arrival there, and the plane continue without landing to a different designated base or to the same base for more views.

There are, of course, improvements to be worked out as the result of this first test, principally in the flash bombs. It is expected that further experiments from heights to 5000 feet will be made at McCook Field in the near future.