

PANORAMIC STEREO EXPERIMENT

██████████ Project 9039

Letter Report No. 1

STATINTL

April 20, 1962

This report covers work performed through April 16, 1962.

In order to demonstrate the interpretability of convergent stereoscopic panoramic photography, the following engineering development work was done on ██████████ airborne equipment.

Camera modification. The ██████████ panoramic camera, having a 12-inch focal length, is being used for this project. The ██████████ is suitable in all respects for the purpose except that the film transport system was modified to reduce the metering cycle to 5 seconds. Engineering and ground operational tests of the modified camera were performed during the week of April 9.

Camera mount. A new mount, which provides the ██████████ sufficient rotational freedom to obtain the required degree of convergence, was designed and fabricated. The camera was mounted in the aircraft to sweep across the flight line, with a forward tilt of  $\pm 15$  degrees from the vertical. The camera mount also provides  $\pm 10$  degrees of lateral tilt correction and a full 360-degree rotation about the vertical axis. If desired, therefore, the camera sweep could be set parallel to the flight line, or at any other desired orientation.

View finder. An A-2 view finder was purchased and slightly modified to fit the space limits of the aircraft and camera mount. The glass viewing plate has two pairs of cross-hairs, one of which identifies the

nadir point of the exposure being made and one the nadir point of the next exposure. The aerial photographer thus has control of the interval between exposures, and can easily obtain convergent stereo mates covering identical ground areas, or having any desired amount of overlap.

On April 13 a test flight was made over the Central Valley of California. In spite of extensive ground testing of the camera before the flight, the film metering system proved faulty, and satisfactory coverage could not be obtained. A new cam was installed and the flight was repeated the next day. Flight altitude was 20,000 feet, which with a 12-inch lens provided a photo scale of 1:20,000. The first pass was made from a point just south of Modesto for five miles to the east. Exposures were made manually at intervals of one-half mile. Then the pass was repeated from east to west to obtain convergent stereo mates covering identical ground areas.

Originally it had been planned to fly additional photography over the San Francisco Bay Area on the same day, but this could not be done because of cloudy weather near the Pacific Coast. Another flight has therefore been scheduled to obtain the Bay Area coverage. One flight line will be flown along the East Bay shore, and another will cover the area from San Jose about ten miles to the south. In addition, an east-west flight line will be flown for twenty-five miles across the Central Valley. Convergent stereo coverage of these areas will provide a great variety of topography, urban and suburban culture, shoreline and water features, natural vegetation, and cultivated crops, and will therefore lend itself to extensive experiments demonstrating the interpretability of panoramic

stereo photography. Some of the photographs taken on the return passes will have random overlap, obtained by intervalometer setting, instead of the identical ground areas photographed on the return pass in the first flights. This will provide photography more closely resembling that likely to be obtained in an operational situation.

STATINTL

Stereo panoramic viewer. Two projection viewers developed by [REDACTED] were modified for stereoscopic projection through the polaroid principle. On April 16 the modified viewer was in the last stages of assembly. The viewer has a Polacoat screen 15 inches high by 45 inches wide. It displays 70-mm slides made from the panoramic negatives at approximately 20X magnification, showing the area from the center of format toward either horizon and rectifying both the forward convergent tilt and the lateral obliquity toward the horizons. The slides are swept before the projection lens along a perpendicular cam path, and tilted as required to provide continuous vertical registration of conjugate stereo images. Horizontal registration at the edges of the panoramic format is maintained by tilting the Polacoat screen.

The stereo viewer is to be tested, aligned, and adjusted during the week of April 23. Stereo pairs from the photography obtained on April 13-14, as well as that from the flight still to be made, will then be projected and evaluated. Separate evaluations will be made for various categories of image, both artifacts and natural features, and for images at various distances from the photo centers. Arrangements will then be made for demonstration of the photography and equipment to representatives of the contracting agency. The results will be described in the final report.

